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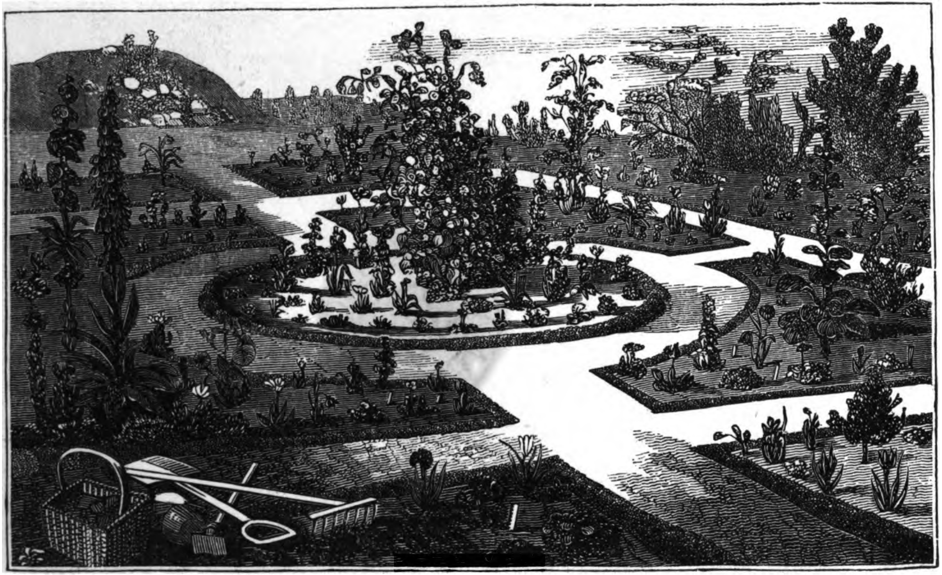

THE GARDEN.

# CONVERSATIONS

ON

# GARDENING;

WITH

INCIDENTAL REMARKS

ON

# NATURAL HISTORY.

BY THE AUTHOR OF THE ELEMENTS OF BOTANY.

LONDON:
JOHN W. PARKER, WEST STRAND.
MDCCCXXXIV.

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# PREFACE.

THE best preface to this little work will be an account of what has been attempted in it. The utility of exciting in the minds of young persons a fondness for gardening is universally admitted.

That there are several excellent works intended for this purpose is undeniable, but the author thinks that, generally speaking, they are too technical, and likely, from the practical difficulty of their instructions, and from the time and expense required to effect what they propose, to discourage rather than to aid the attempts of the young gardener.

A child who would gladly *garden*, and raise flowers by his own skill and labour, is mortified at reading a description of beautiful plants which he cannot hope to succeed in rearing, for want of the hot-bed, stove, forcing-house, &c., required for their culture. But, all the useful part of the occupation, as a rational and innocent recreation, tending to form habits of industry, order, and observation, may be attained in a garden, where nothing but the more common and hardier plants are cultivated.

In the present work, two children are supposed to lay out and complete a small garden, which they stock with such shrubs and flowers as many can obtain, by a judicious indulgence on the part of their parents and friends, and by means of their own activity and intelligence, without the necessity for more pecuniary expenditure than most children are enabled to make.

It is obvious, however, that by rather exceeding these limits, opportunity might be afforded for instructions that may be useful to some, while those who are not able or willing to attempt so much, may select or abridge, as it were, the garden and its contents so as to suit their own means and inclinations.

The conversational form was adopted as being generally considered more captivating, and less tedious to young readers; and as giving an opportunity of introducing digressions on natural history, which, though necessarily brief and simple, may relieve the tedium of technical precepts, and foster a taste for that delightful study. An attempt has been made to give the principle on which the operations of horticulture are founded, as deduced from botanical physiology, of the most elemental kind; such as is contained in the *Elements of Botany*.

It may, perhaps, be objected that the children talk rather too learnedly, but this is inevitable if *instruction* is to be conveyed. If the conversation of children were made *natural* in books, it might entertain, but could not *teach* much: and no more knowledge is presupposed in the present work on the part of the eldest, than may be acquired by the younger, and all readers of her age.

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# CONVERSATIONS

ON

# GARDENING.

---

*Mary.* OH, Henry, Mamma has just told me such good news! Papa means to give us a piece of ground in the newly enclosed field, to make a Garden of; and we are to have it all to ourselves, and plant pretty flowers; we shall be so happy, and have such a beautiful garden.

*Henry.* I have just been to see it with papa, and he has been advising me how to lay it out; he says he will let a labourer do all the very hard work for us, and he will have it enclosed with pales on the two open sides; but there will be a great deal to do before we can begin to plant flowers.

*M.* Oh, yes; but what must we do about the grass that grows over it? it will not look like a garden while that is there.

*H*. Papa and I have settled all about that; he says he will have the *turf pared off* for us; and the ground all dug over, and the turf, or grass, as you call it, will be very useful to us to make *edgings* to our beds and borders.

*M*. Edgings to our beds, what is that?

*H*. Do not you know that round the flower-borders in the real garden there is a row of pretty little plants called *box?* Now, it takes a long time, and much care and trouble to make such a border of box, though it is much better than any thing else for that purpose; but as there must be something round the beds of flowers, or they will not look neat, sometimes strips of turf are cut and set round them, and that is what we must do at first, unless we plant *thrift* or daisies.

*M*. Well, well, but I suppose while all that is about I may sow some flowers in the middle, as soon as the grass is taken away, because you know they will be growing.

*H*. Softly, softly; the garden must be dug and *laid out*, and the walks made; and the kinds of flowers that are to be planted must be considered, and the places where they are to come, or our garden will be any thing but pretty. Papa says, that to make a garden worth looking at, requires as much thought, and patience, and perseverance, as any thing: and he told me it was to accustom us to be industrious, and to get up early, and to acquire many other good habits and much knowledge, that he gave us the ground.

*M.* I should not think that it wants much learning to make a garden; and as to learning any thing from a garden, I thought all learning was got from books.

*H.* There is very little real learning to be got from books only; it is by observing, that is, by looking at real things, and then thinking about what we see, that we learn. Now, for example, by gardening we shall learn something of Botany and Natural History.

*M.* That is about flowers; Botany means about flowers, does it not?

*H.* Yes; and about trees, and every thing that grows in the ground. Now there are many books about Botany, but if we were to read them all, we should not know half so much as by looking at and studying, plants, and trees. But now let us go and look at the ground for our garden, and settle about the plan of it.

*M*. What do you mean by the *plan* of it?

*H*. I mean the form of the beds and walks, so that the whole may look pretty and regular, and so that we may be able to get to the various parts to cultivate, dig, weed, rake, and so on.

*M*. Shall we have to do all that? I thought that was only necessary in growing lettuces, and cabbages, and those things for eating.

*H*. It is just as much required for flowers as for vegetables.

*M*. But nobody digs and rakes in the fields and woods, and there are plenty of pretty flowers there.

*H*. The flowers in our gardens are much prettier though, and that comes chiefly from their being carefully cultivated, as it is called. Many flowers which are planted in gardens were originally wild flowers in the fields, and by being taken care of they became larger and finer. You know those pretty *anemonies*, or wind-flowers, as they are called, in papa's garden; they were originally wild flowers, such as those you and I gathered last March, in the wood on the other side of the hill.

*M*. Why then we may get some of the very same again this spring, and put them in our garden, and they will be like papa's.

*H*. You will learn, bye and bye, that we can get fine flowers much sooner than by transplanting wild ones.

*M*. I hope I shall be able to do a great deal in the garden to help you; I can rake and hoe a little, as you know.

*H*. Gardening is just the proper employment for little girls; it is not too hard work for them, it is clean, and requires neatness and patience.

*M*. You know a good deal of it, from having been so long at my Uncle's while we were living in town.

*H*. You will soon learn as much. But now I will show you how papa advises us to plan our beds, he made a *sketch* on the spot, and I am to draw it out quite correctly on paper for us to set it out on the ground by.

*M*. I think I shall understand it better when you have drawn it out: and I think it is time for us to go to our lessons, for mamma says we are not to let our garden interfere with our lessons.

*H*. Papa said so too,—so let us go.

Mr. Bentley, as he promised his son, had the turf pared off the piece of ground, the two sides paled in with pales fit for enclosing a flower-garden, and the whole dug over, or *trenched*, to prepare the soil: he told his children to watch these operations, that they might understand them. And Mary received her first lesson, in patience, in gardening, by observing the care with which the turf was taken up, in strips from three to four feet long, by a *paring* shovel, then rolled up like pieces of cloth, and piled away for use. She watched the digging, and observed that instead of beginning at random any where, the man commenced by dividing the piece of ground out into equal beds, by means of a line stretched between two pegs; and then dug from one end of the first bed to the other, throwing the earth he took out on one side. When he got to the end, he began on the next bed, and dug in the contrary direction to that in which he had dug the first, and so alternately backwards and forwards along the beds, till he had dug the whole over, taking care to throw the earth out of each bed into the trench he had made by digging the adjoining one; and he wheeled the earth he had taken from the first trench across the ground, and filled in the last bed with it; by this means every portion of the ground was changed in situation, and the lower part, that had before been buried from the sun and air, was brought to the surface, and that which had for years been uppermost was buried under the rest.

Henry told his sister that this was done, because earth, to render it *fertile*, or capable of bearing plants and enabling them to grow, ought to be exposed to the action of the sun, and wind, and dew, and rain.

*M*. What does the earth do for trees and plants, except hold them upright?

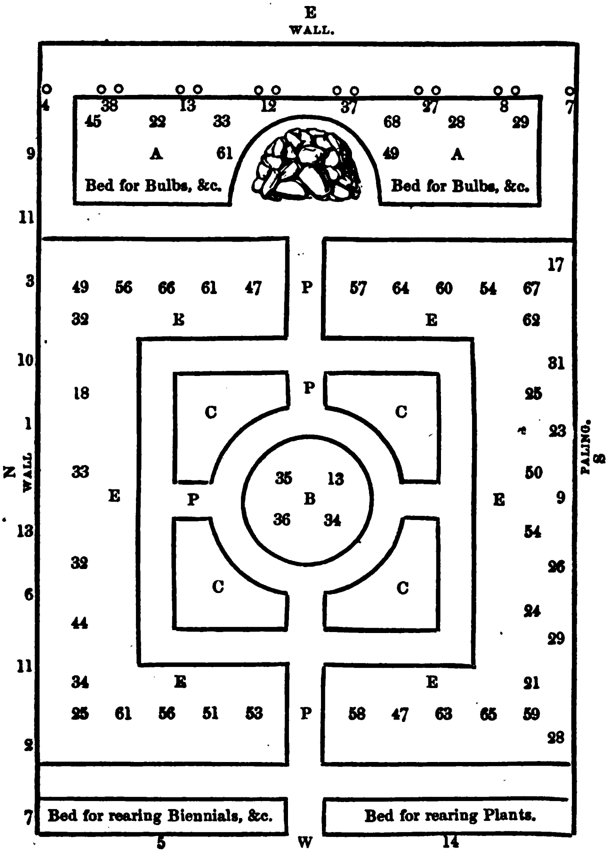
*H*. All things that *grow*, or increase in size, do so by *food* of some kind; children grow to men and women by eating bread and meat; cattle eat grass, you know. Now plants live on water and air, and some mineral substances, and these they get from the earth, papa tells me: the ground receives the water which falls in rain, and by sucking it up as a sponge does, it enables the roots of the plants, which spread themselves in the ground, to drink it up, as it were, in proper quantities for their nourishment.

*M.* Then the roots of plants are like our mouths; but you talk as if plants were like men and animals; plants live, and grow, and die, I know, but still they are not like animals.

*H.* Animals are more perfect in possessing a more complicated structure, and having a species of reason called instinct to influence them, and they possess the power of moving about; but plants resemble animals, in so far as they have particular parts, called organs, necessary for their existence and growth, and in requiring food to enable them to live.

*M.* What paper is that you have in your hand, and what are you going to do with that roll of string and those pieces of wood?

*H.* This is a plan of our garden, and I am going to set it out by this string and pegs. See, I have contrived it so as to keep the sloping bank under the garden wall; against the south wall we can train creeping plants which require a warm and sunny aspect, while the bank can be kept for flowers equally demanding a hot sun: this bank, with a walk at the bottom, will reduce the piece of ground to a square, and in the centre we will have a circular border, as is shown


E
WALL.
A
A
Bed for Bulbs, &c.
Bed for Bulbs, &c.
P
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Bed for rearing Biennials, &c.
Bed for rearing Plants.
W

by the circle in the plan, with a walk round it. Then this is a gravel walk forming a square, leaving the irregular borders, C, between it and the circular path; on the outer side of this square path there is another bed, which on the north and south sides will come under the wall and opposite palings; while on the east and west sides it will form a double border, with a walk between it and the palings on one side, and between it and the slope on the other.

*M.* That will be nice, and I suppose these, P, are paths across the flower-beds to get at the inner circle.

*H.* Exactly; I see you begin to understand it. Now, to make this look pretty, we must plant the tallest growing flowers in the centre of the circle, and those next them outwards to be lower and lower, so that they may form a *cone* when in blossom; and by contriving so that flowers of the same colour may not come next each other, and so that some may be in blossom in every part of the garden, at each season of the spring, summer, and autumn, the best possible effect will be produced.

*M.* But to do all that will require a great deal of contriving. I suppose the height to which all plants and flowers commonly grow is well known, so that we have only to select ours for our garden accordingly.

*H.* Yes; and papa will instruct us how to draw out a list of plants, which we shall find to answer our purpose, with the proper times for sowing them, and all necessary information to guide us. But now to set out our plan. Here, hold this, and these pegs, till I want them.

---

MARY watched her brother's proceedings with great attention, and helped him to the best of her power. He set off from the S. W. and N. W. corners, four feet by measure, along the south and north sides; and sticking down a peg at each mark, he stretched a string tight between them for the border. He then in a similar manner set off the walk three feet wide, and taking the length of the walk, or the whole width of the garden, from north to south, in a string, he found it exactly fifty-six feet; he set this same length along each side from the edge of the walk, and having set down a peg at each mark, he stretched another string for the inner edge of the walk next the bank on the east, and thus made the square; for he knew that his father had had the paling set correctly parallel and perpendicular to the two walls, which were also truly at right angles to each other. The remaining piece at the east end was left for the sloping bank, and for the walks at the top and bottom of it. These walks he set off of the right width, the bank being left about twelve feet wide.

*H*. Now, Mary, how would you find the centre of this square?

*M*. Why, I would set off half the width of the square from the middle of the four sides, and that would find the middle of it.

*H*. Ay, but that would require four operations at least, whereas by the method I shall follow I can do it in two.

Henry then, looking very grave, fixed one string, strained tightly to two pegs, in opposite corners of the square, and having done the same with the two remaining opposite corners, he stuck a stout stake in the point where the two strings crossed each other, knowing that this was the true centre of the square.

Mary soon perceived the truth of this process, and was much struck with its simplicity: when her brother told her that Geometry taught him this plan of proceeding, she uttered a deep sigh at the quantity of things she knew nothing about, and which she longed to learn.

Henry then put his string with a noose over the stake, and having measured eight feet along the string from the stake, he carried the line round, sticking in stakes at small distances apart to form a circle. In a similar manner he marked out another circle beyond the first, thus enclosing a circular path between them of three feet and a half wide.

He next set off the outer bed, on the four sides eight feet wide, and within them a walk of three and a half feet, marking the angles with stakes and stretching strings for the sides; and having also marked out the cross-paths, he asked the labourer to dig out the walks to the depth of fourteen or fifteen inches, making the sides and bottoms smooth and even, and the former truly straight by the stretched lines.

At the bottom of the trenches thus dug, broken bricks and dry rubbish were laid, to the depth of six or eight inches; on this, coarse gravel, which being rammed down hard, fine gravel was at last spread three inches deep, the top being made curved so that the water should run off the gravel on to the flower-beds, and by soaking through might be drained off by the coarse rubbish below.

His next care was to prepare his beds by digging and raking till they were quite smooth and free from clods, large stones, and all rubbish which might disfigure them. As the soil was already tolerably light, and had never been cultivated, having been pasture-land from time immemorial, it had no need of any manuring, and except that he dug in a quantity of fine sand, dry leaves, and well dried and crumbled cow-dung, there needed no further preparations to make it fit for a flower-garden: the grass edgings had been laid down round the borders before the last thickness of gravel was laid on them, the turf being trimmed into perfectly straight and parallel edges.

All this took several days to effect, and Henry afterwards, aided by the man, rolled the gravel with a garden-roller over and over again, till it was hard and solid, taking the opportunity of doing it always after a shower, or early in the morning when the dew lay on the earth, in order that the gravel, being damp, might *bind* better.

Mr. Bentley, aware of the difficulty of laying the strips of turf round the circles, allowed his children to have sufficient box from his gardener for the two edgings of the circular walks, and they proceeded to plant it with great care as to placing the small plants in a true circle, without angles or irregularities.

The box was given to them in small plants, with many branches; these the gardener helped them to take off, so that a piece of the root should remain to each slip: the slips were put into a small trench, hollowed out for them at equal distances and quite upright. The earth was pressed in close to the stems, and trod down hard so as to lie close to the roots; and the earth on the border side again hoed and raked fine.

*M.* Papa says that if we take care, this box in time will furnish us with enough for our whole garden; but how is that to be done?

*H.* When each little shrub of box is grown, and has many little branches, it is taken up, these *shoots*, as they are called, are torn off with care, as you have seen done with this, and being planted, become in time branched in their turn, and thus furnish more. But, besides this necessity for taking it up to obtain fresh shoots, box-edgings must be cut with garden-shears twice a year to prevent their growing too high and straggling, and to render the edging smooth and even.

*M.* I should have thought cutting such a little thing with shears would kill it.

*H.* Plants are very hardy in that respect, they bear cutting and lopping very well; many shrubby plants thrive all the better for being cut or *pruned*, as it is called, very frequently, as you will learn in time. Box is particularly hardy, it thrives in any soil, can do with little or no sun; when trimmed neatly to a regular height and thickness it is as efficient for the purpose it is meant for, of keeping the mould from falling off the beds on the gravel-walks, as a board would be, and is much prettier than any thing else. It is a tree in miniature.

*M.* Mamma advised me to ask you the botanical name and history of the plants we put in our garden; she said it would be useful to both of us, as she was anxious we should know a good deal of botany especially.

*H.* Yes, and papa says so too; he says that the more we learn of plants, and the more we examine them, the more we shall love and adore the CREATOR who made them; love him for his goodness, which shows itself even in furnishing such a variety of beautiful forms and colours for our gratification; and adore him for his wisdom and power, surpassing all thought, which are seen in the structure of the smallest plant, "even unto the hyssop, that springeth out of the wall."

*M.* But surely every thing which surrounds us will teach us *that;* and the wonderful structure of animals is more striking than that of trees and flowers.

*H.* It is so, but we are too young yet to understand anatomy, and those sciences which teach about animals, while the youngest child is struck with a flower, if its beauty be pointed out to it.

*M*. I feel sorry that I ever pulled a flower to pieces wantonly, since mamma was so good as to explain to me the different parts, and their supposed uses, yesterday.

*H*. What flower did she show you? for, in the winter, there are not many to be found except in green-houses.

*M*. It was an anemone and a snow-drop, out of the real garden; but I am afraid I have forgot some of what she told me, there were such a number of hard names.

*H*. You will soon learn them again; but tell me what you best remember.

*M*. Why, about there being two great divisions of plants, very easily distinguished from each other; the one sort always proceeding from a seed having two seed-leaves, while the other sort grow from a seed having only one; but she said there were many apparent exceptions to this rule, which I should learn in time. Now I forget the long long words she called these two divisions by: do you know them?

*H.* Yes; the former are called Dicotyledonous, and the latter Monocotyledonous; but did not mamma tell you that there were two, still more important, classes under which plants are arranged?

*M.* Oh, yes! the one contained all plants that have flowers and produce seeds; and the other contains all those which do not bear flowers and seeds. And do you know, Henry, that sea-weeds, and mushrooms, and dry rot, and mouldiness, and all those sort of things, are plants, just as much as oaks, and elms, and roses, and stocks?

*H.* Every thing must be either mineral, or vegetable, or animal, or, more properly speaking, every thing must be either inorganic or organic; minerals being the former, and plants and animals the latter: now the things you named are not animals, nor minerals, therefore they must be plants: there's logic for you!

*M.* Well, now, tell me about box.

*H.* This box is the *species* called sempervirens (meaning evergreen), of the *genus* Buxus; it is a native of the Levant, I believe; and another variety, called the tree-box, which you have often seen in shrubberies, furnishes the wood made use of for engraving *cuts* on, as they are called.

*M*. What are cuts?

*H*. You know the pictures in the *Saturday Magazine*, which we are so fond of looking at; those are called *cuts*, to distinguish them from engravings made on copper or steel, or prints taken from stone.

*M*. Then box is of much greater importance to us, than merely for edgings to flower-borders.

*H*. Yes, indeed, for though perhaps other woods *might* answer, if the supply of box were to fail, yet they are far inferior; at least those that have been, as yet, tried, have been found so.

*M*. Where do they get the quantity that must be wanted for so many books? I never saw any box-trees large enough to furnish such pieces as some cuts must require.

*H*. It is brought from the Levant; but when the cut is large, two or more pieces are fastened together.

A FEW days afterwards, in the evening, Henry showed his sister the catalogue of plants which he had written out with his father's advice, and which he thus explained, referring to the plan of his garden (see p. 9), on which he had marked, by numbers, the spots where he proposed planting the principal shrubs.

*Henry*. Papa advises us not to attempt to have any plants in our garden, that require either artificial heat, to bring them forward, or to keep them in winter, or that require great care in rearing; because, he says, that we should not be able to spare so much time or money as such plants would cost us; so I have chosen only those for my list which are either *hardy*, as it is called, that is, which stand our climate without being put in a green or hot-house, and the few which are not so, only require covering over with mats, or straw, in severe frosts, and being covered with hand-glasses when first coming up,—or which, with this care, and being put in a sheltered and sunny situation, will, generally, get through our winters.

*Mary*. Then we shall not have, in our garden, any of those pretty flowers which we saw last summer at Messrs. Hoe and Rake's.

*H.* We cannot have those rare ones which we saw in their hot-houses, certainly, but we can have many quite as pretty: how many kinds of flowers would content you, Mary?

*M.* Oh, I should like—let me see—why fifty or sixty different kinds; but I suppose I must be content with not so many.

*H.* Well, then, I will promise you, if you will work hard with me, that our garden shall have, at least, twice as many. Now mind, while I explain. *(See list of plants at the end.)*

The plants in the catalogue are arranged, first, with regard to their size; I begin with large climbing shrubs, for covering our walls and pales, then standard shrubs, for the backs of the two beds, north and south—

*M.* Standard shrubs! what are they?

*H.* That is, shrubs which do not require a wall, or trellis, or poles, to support them: next in the list come tall *herbaceous* plants, for the back rows, or plants that are not shrubs; next, those which are lower, for the middle rows, or second rows; and lastly, the dwarf, or lowest kinds, for the front rows of the borders, next the edging,—so that, by planting them accordingly, and taking care that one plant shall never come exactly before another, but between two which are in the row behind it, every flower will be seen.

*M.* I understand,—as you have put these numbers in your plan.

*H.* Yes.—Then in each of these divisions I have arranged the plants together, according to their colours, as red,—including under that head all shades, as pink, crimson, scarlet, and so on,—blue, and yellow; now, can you guess what that is done for?

*M.* To be sure; because it would be disagreeable to the eye to see two red flowers coming next each other, or two blue, or two yellow; so that, by planting them from each division in your list, you will avoid this.

*H.* You are a wise girl. Now there is a third thing, equally important in planting a garden, and that is, to take care that the plants are distributed about it, so that there shall be always some in blossom, in every part of the ground, in every month of the year; for it would not be pretty to see one border all brilliant with flowers in July, and another without any at all; so, under each colour of each division, I have arranged my plants in the order of their flowering.

*M.* That is good: what pains you must have taken. Then, I suppose, when you had finished your list, you put the numbers in the plan according to these rules, and you will plant the flowers according to the plan.

*H.* We will so: for example, you see this is the north wall, which, as you know, is the back of the stables, and is tolerably high; against this, which is admirably suited to delicate plants, that require shelter and sun, I have put 1, scented Allspice, which bears a whitish flower in January and February; then at 2 and 3, one on each side, there are the Corchorus and Pyrus japonica, the flowers of which are yellow and scarlet, and appear at the same time; then at 4 and 7, we have the white flowers of the Clemátis florida, and the blue ones of the Clemátis integrifolia at the same time; and between these will be, 10, the beautiful white Magnolia and the brown Calycanthus floridus; while the brilliant scarlet of the Trumpet-flower, at 11, will divide the Magnolia from the Clemátis's.

*M.* And what have you put at 9 and 13.

*H*. Why, as it will be two or three years, at least, before the Magnolia and the Carolina All-spice will blossom at all—

*M*. Oh, dear! I never thought of that; then we shall not have all these this summer.

*H*. Gardeners must always be thinking of what is *to be*, and not only of what *is*. It must take two or three years to make an entirely new garden; but we shall have the pleasure of looking forward and seeing the progress of it, and there will be always plenty to do and plenty to admire. So, as I was going to tell you, I have put at 9, or I mean to put, a Catalonian Jasmin, which grows quickly; and at 13, the climbing Cobea, which, in one summer, will cover a good deal of wall.

*M*. Let me try and make out your arrangement for the south side. Here, in the centre, at 19, you mean to have a Magnolia glauca: I do not know that; what is it like?

*H*. It is the most beautiful and fragrant of all the tribe; and has the merit, moreover, of being more hardy; but it is, as yet, not so well known as the other: I hope to be able to get a layer, and to make it succeed in our place.

*M.* Layer! ay, true, I must ask you about that some other time. Well, on one side of this white Magnolia, there is, 23, the yellow Honeysuckle, and, 26, the pink St. Peter's wort.

*H.* And between the white and yellow, there will be, 50, the red-blossomed Chelone; and between the white and pink there will be the beautiful yellow Œnothera grandiflora, and so on.

*M.* And can we do the same with the smaller plants?

*H.* Yes; still more easily, because there are a greater variety of shades of colours: I have not, therefore, marked the numbers for the front rows in the plan; but, of course, attention must first be paid to placing every plant, or shrub, in the situation best suited to it, with regard to shelter, soil, and air.

*M.* By the by, how can you manage that? for some plants want sandy soil, some loam, some peat, and so on, as I see by your list; now all the earth of our garden is of one sort, of course.

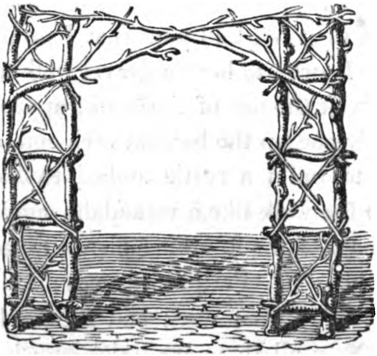
*H.* The American plants, as the Magnolia, Allspice, Rhododendron, and others, require peat or bog earth; and when I have marked the places where such plants are to be put, according to our plan, I shall dig out the common earth, and fill it in again with the proper kind; and, in somewhat the same manner, we can prepare the places for smaller plants, as, for example, by raking in some sand, where a light dry soil is required, or by mixing some rotten leaves or dung where a rich one is necessary; but if care be taken in cultivation, most things will flourish tolerably, even if not exactly in the soil best suited to them.

*M*. What does this half circle, in the middle of what I suppose is the sloping bed, mean?

*H*. I have not told you what I propose doing there. I mean to have a gravel walk along that east side at the top of the bank, approached by a narrow one up the bank at each end, and I am going to build a rustic arched trellis-work to shut in the walk like a verandah; against this I have marked the following plants to be trained, 13, Cobea; 38, Periploca græca; 12, Passion-flower; 27, China rose; and 8, the Boursault rose. Now all these are quick-growing plants, and will, in a great degree, cover the trellis this summer, so we shall have a nice shady walk raised, from whence we can overlook our garden, and can also have so many more pretty climbing plants, for which we should not otherwise have had a place.

*M.* That will be delightful, but how are you to build such a trellis?

*H.* I shall get Mr. Croft, the Bailiff, to give me out of the forest, a dozen straightish poles, or young saplings, about seven or eight feet long: these I shall trim, and place in couples, about two feet apart, with seven feet between the couples: then I shall nail cross-pieces of sound boughs, so as to form a trellis, and a rustic arch between each couple of stakes, as you have seen garden-chairs and tables made; it will be all



easy enough, if care be taken at first to have the stakes set firmly in the ground, upright and in one line. I shall set about it to-morrow, because the sooner we get the cuttings of the plants in, the better.

*M*. And then I see by the plan you propose having a few shrubs, as the Alexandrian Laurel, Broom, Coronilla, and others, at the top of the bank, before the trellis; but what is this in the semicircle, (see plan.)

*H*. That is my second grand plot; I shall dig out the bank in that semicircle, *facing* with turf the more upright part that will be formed by so doing, to prevent the earth from falling down: and in the middle I mean to make a *rock-work*. There are plenty of pieces of limestone to be had from the old quarry, and with a few bricks, large pebbles, and so on, we can form a good-sized rock-work by piling these together; then the crevices must be filled up with fine mould and sand, and those kinds of plants which thrive on such places, being planted, they soon cover over the stones, and form a pretty addition to a garden.

*M*. Such plants as grow naturally on walls, and roofs, and in stony places, are fit for rock-work I suppose.

*H.* Yes, such as the common house-leek, the toad-flax, and many others; I have added a list of them, (*see list.*) Then I propose that we keep the lower part of the bank for hyacinths, tulips, or any bulbous plants we may have given us, and which look well in beds; and if we do not get enough to fill the spaces, we can set tender plants in pots during the warm months, or plant sweet peas, or any annuals we like; but we shall want some part of the bank for a bed to raise flowers in from seed, which are afterwards to be planted out; and if we keep the bed in good order, it will not be any disgrace to our garden, though perhaps not so showy.

*M.* And I suppose by your not having marked any thing on them, you intend to reserve the two narrow beds under the west paling for the same purpose.

*H.* Perhaps so: I mean to cover those pales with a Virginian creeper, 14, and a Fontanesia.

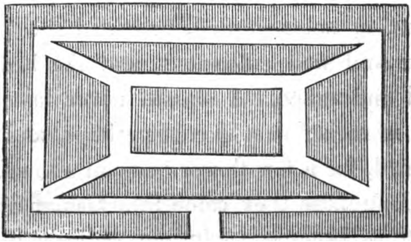
*M.* By the by, I was explaining your plan to Miss Berkeley, and drew it out as well as I could; she said she thought it was very formal, and wondered why you did not make your borders in prettier patterns, such as crosses, lozenges, hearts, and so on. *French beds* she called them.

*H*. Beds of those fanciful forms, look very well on paper, and on green turf, but they are troublesome to make with gravel-walks, and require a great deal of care to edge and keep in order; and moreover, the form of the border is not seen, or not regarded, provided the flowers are fine and well cultivated, and the bed well weeded and raked. I should never lay out a garden in such forms, except perhaps, as I have mentioned, for a few flower-beds on a lawn.

*M*. I suppose they came into fashion from a belief that, because a winding walk in a large plantation or shubbery was beautiful, where the view was enclosed by lofty trees, and therefore at every turn presented some new object, the same effect would be produced in a flower-garden.

*H*. I should hardly think people could have been so absurd, as if there were any resemblance between a plantation of tall trees and shrubs as you say, and a few beds of flowers not more than three feet high, separated by gravel walks which must bear a greater proportion to the beds than those of a shrubbery do. No, I suppose it was novelty that was the charm.

Look here, here is another plan for a garden I drew out, with only borders enclosed by straight lines; you may take care of it for some of your friends.



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Henry worked vigorously in the garden during all his play-hours, getting every thing ready; he had many fine young plants given him by his father and his friends, with whom he was a favourite for his intelligence, industry, and good conduct. These acquisitions he planted with his father's advice, and a gardener's assistance, according to the arrangement in his plan, and by the end of the month of November, most of the shrubs, trailing or standard, were put in their places, as well as roots of the hardy perennials; and all appeared likely to thrive. He had next to get his rock-work piled up, a task of some difficulty, as he had several times to begin again, from not taking the weight and size of the stones sufficiently into consideration, so as to secure the stability of his work.

He had also commenced his trellis-work, and got it so far advanced as to be able to plant two or three of the hardier shrubs which he intended to train up it. He took care to train the young branches of such of these as had any, in the right directions at first; by tying them to the wood-work with stout bass, not so tight as not to allow for the future growth of the stem. These and frequent diggings to the beds, trimming the edgings, raking and rolling the gravel-walks, and matting up the tenderer shrubs, on the first appearance of frost, were the principal out-door employments in the garden itself during the next month.

WHILE her brother was thus engaged in the harder work, Mary had not been idle in her preparations: among the more important of which were the following, which she executed with great skill and neatness. Her brother cut a bundle of common laths, such as plasterers use, into lengths of six inches, these the little girl split down into two, cutting one end tapering off to a point, and smoothing the faces of the other slightly.

She then painted the broad end on both sides with white paint, laid on very thin with a small brush; when the paint was a little dry, she wrote on it with a soft black-lead pencil, the number, and the name, from her brother's catalogue of all the flowers and plants they had decided on having in their garden; preparing twelve or even more sticks with the names of some, which would occur several times in the borders, in different spots, and not fewer than four or five of any.

When the paint was quite dry, which took two or three days to accomplish, she dipped the tapered ends into some hot pitch, using the greatest care neither to soil her fingers and clothes, nor to drop the paint and pitch on the floor. When the pitch was dry, Mary tied the sticks up in separate bundles, agreeing with the arrangement in the catalogue, and put them away till they were wanted.

She also split another bundle of laths into sticks of different lengths for tying flowers, such as sweet peas, pinks, &c.

In fine weather, she helped her brother out of doors, in hoeing and raking the borders that had been trod upon in planting the shrubs; and as she was persuaded of the necessity for the utmost neatness and regularity in a flower-garden, and knew that every hour's pains taken now, would save them many hereafter, she spared no trouble in picking out all stones, bits of wood, or rubbish, from the mould as she raked it, so that she got the borders into the best possible order.

Both brother and sister eagerly read and learnt all that could be useful to them in their gardening, and Henry, in order to improve himself, taught his sister some of the general principles of botanical physiology, by means of which she would better be able to understand and practise the art of gardening; for this purpose he wrote out for her use, the following observations, which she read with him.

All the practical methods of horticulture, or gardening, must be founded on the laws of vegetable life, and can never be decidedly opposed to these laws, though perhaps the connexion may not always be apparent.

In transplanting a growing plant of any kind, that will bear the operation, the first thing to be attended to, is to injure the root as little as possible, because it is by means of the root that the plant derives the nutriment necessary to its existence.

And since botanists have discovered that it is only by the extremities of the fibres of the roots, that plants draw up their food from the earth; it is essential that these delicate parts should not be torn or broken off, in taking up the plant to be removed. In the case of trees or shrubs, therefore, it is necessary to dig round at a considerable distance from the stem, in order not to run the risk of wounding the main branches of the root, and after these are laid bare, the fibres should be disengaged gently from the earth, so that they may not be broken by the effort to raise the tree.

The plant being moved to the spot where it is to be set, a hole deep enough to receive the whole root, having been previously dug, sufficiently large to obviate the necessity for bending or cutting any of the branches, the shrub is then held upright in the hole, taking care that the same sides of the trunk or stem are turned to the same quarters of the compass to which they formerly were presented; that the soil should be the same, as nearly as possible, is obviously necessary. While one or more persons hold the shrub upright, others throw in the earth, broken as fine as possible, in small quantities at a time on the roots, till they are entirely covered, treading or beating it down in order that it may come into close contact with the fibres, which otherwise not only could not suck up the moisture from the soil, but would be rotted by the wet lying in the hollow spaces which might be left if the earth were not rammed down; hence the necessity for having the earth fine, because not only would it be impossible to make it lie close to the roots, if it were thrown in, in lumps, but the new fibres which the plant forms could not penetrate the hard earthy clods.

This latter consideration also accounts for the necessity of making the earth very fine for sowing seeds in, as will be presently mentioned.

It oftentimes is necessary to top and prune the branches of a tree or shrub that is transplanted: to understand the reason of this, it must be remembered that, naturally, the branches of a plant are sufficiently large and numerous to bear leaves adequate to change and modify all the water supplied by the entire root, into the food proper for the plant; and in doing this a considerable portion of the sap evaporates into the air from the surface of the leaves, the proper quantity only being retained in them to be acted on by light and air.

Now the root, whatever pains may have been taken, being unavoidably injured by the act of transplanting, is not capable of supplying the same quantity of sap to the plant as before; if therefore all the leaves were produced, or left on the transplanted plant, too much would be carried off by evaporation, and enough would not be left for the nutrition of the shrub: hence the necessity for pruning, so as to reduce the *digestive power* of the plant, if it may be called so, of the upper part, so as to suit the diminished quantity of moisture supplied by the roots.

It is for the same reason that only a few buds are left on a *cutting* or *slip*, according to the rapidity with which the species of plant will form new roots from such a portion of it. This will be explained presently.

*Mary.* But why is it necessary to keep the shrub turned in the same direction with respect to the compass as before?

*Henry.* I doubt if I could make you understand that, and indeed I am not acquainted with all the reasons myself, for papa when explaining it to me, said that I could not understand it fully till I knew more of chemistry and other sciences; but he told me that winds from different quarters brought different degrees of rain and moisture, and that a tree sent out its branches accordingly, those being the largest and most flourishing which were turned towards a favourable aspect, and that it was necessary to keep the same aspect when the plant changed its place, or else its vegetation would be checked by the efforts it must make to accommodate itself to its new position.

*M*. Then I suppose, the reason why all the sides of the trees of a forest turned towards one quarter of the heavens, are more covered with lichens and moss than the others, is that these minute plants as you know they are, flourish most when exposed to the more watery winds.

*H*. I believe so—and the Indians of North America trace their way through their vast forests by observing these signs, which furnish them with a sort of compass in place of the stars which are hid from them, since the mossy sides of the trees will be all turned in one direction. Did you ever hear of the ingenious suggestions of some French foresters, for making oak-trees grow in a curved form, adapted for ship-building, which they are made artificially to assume after they are cut down, by great labour, and only after a long time?

*M.* No.

*H.* Knowing that all plants grow towards the light, they proposed, when a fine tree was discovered in the inner part of a forest, that a line of trees to it should be cut down from the outer side of the forest on that side towards which they wished the trunk to bend. They expected that the effort of the tree to approach the light, thus let in, would give the trunk a curvature adapted to their purpose.

*M.* And did their plan succeed?

*H.* No, I believe not, it was found that the quality of the wood was injured by the proceeding; it certainly is not practised.

I must further mention to you, though I have not written it down, that the *best* time for transplanting is when the leaves are off, because then the sap is not quickly evaporated, and the roots are able to supply a sufficient quantity. If the plant is an evergreen, it should be transplanted in damp weather, because evaporation does not go on so rapidly from the leaves when the air is already loaded with moisture. Or if the weather be dry, water must be supplied to the roots in sufficient abundance to meet the waste by the leaves. But the main object is to injure the fibres of the root as little as possible. In transplanting small shrubby plants, as wall-flowers, where the leaves are numerous, still more attention to this point must be paid.

In sowing seed of all kinds, it is necessary, for the reasons already given, to make the earth *as fine as possible;* it is better to sow the seed immediately after the mould has been raked for this purpose, and since any moving of earth is impracticable when the soil is wet, because in that case the mould gets worked into a paste which hardens when dry, and is prejudicial to vegetation, it follows that all seed must be sowed in dry weather.

The depth at which seed should be sowed, depends on its size and the time it lies in the earth before it sprouts, or *germinates;* large seeds, as scarlet beans, nasturtiums, &c., may be put from one and a half to three inches deep below the surface, and small seed, such as Virginian stock or Mignonette should be scattered on the surface, when this has been raked very smooth and fine, and then covered up by being sprinkled over with fine mould so as just to hide it.

It is better to sow all seeds either in *drills* or in shallow, basin-like hollows, scooped out for the purpose, and not by means of a dibble or stick; because in this last mode of sowing seed, the earth, pressed by the stick, is hardened round the hole, by which means the fine fibres of the young root are impeded from penetrating the earth.

When the drill or hole is filled up again, the earth should be pressed down hard on the seed, so that it may touch it on all sides, for if the seed lie in a hollow, wet will settle in that vacancy, and will chill and rot the seed. The best way is to strike the spot where seed has been sowed, all over with the back of a spade; the larger and deeper the seed, the harder should the earth be struck down on it. The surface of the mould may then be raked over very lightly, to remove the flat impressions of the spade, which would injure the look of the bed if suffered to remain.

Whenever seed is sowed in a drill, this should be made straight, by means of a line stretched between pegs of wood, the drill should be made by means of a rake or hoe, along the line thus marked. When the seed has been scattered in the drill, it should be distributed equally along it, if not so already, by the rake or a bit of stick; the earth which came out of the drill must be raked in again, care being taken not to disturb the seed, and then pressed down as before directed.

Any seed dropped or scattered where it is not wanted, is productive of two losses, the waste of the seed, and the time employed in pulling up these *weeds* when they come up, as in this case they must be considered. Seeds should, therefore, be kept in little paper bags so that they may not be spilt while sowing is going on.

When large seeds are sowed, they should be put into the drill or hole, with regularity, to avoid the necessity of having to pull up the young plants if they come up crowded in one place, and of putting in fresh seed if they are too thin in another. A marking-stick should be stuck in immediately when seed is sowed, else the precise spot may be forgotten, and another patch of seed be placed too near the former.

It is the common error of young gardeners to crowd their plants too much; a greater space should be left between two small plants than either occupy when in blossom. In sowing *annuals*, still more room should be left, because this admits of new seeds being sowed in succession during the spring months, for the purpose of keeping the plant in blossom as long as possible.

Thus for example, if a patch of sweet peas, and a patch of dwarf larkspur are sowed adjoining each other in the beginning of March, more than double the usual space should be left between them, to allow of other sowings of either coming between, in May and July.

But it is not advisable to sow the same seed in the same place in the garden, too often in the same spring, because the newer plants will be coming up before the older are over, and the group will be too large and straggling. Sow, therefore, the sweet peas and larkspurs again in April and June in another spot for a succession.

As soon as the young plants are well out of the ground, stir the mould round them carefully with a bit of stick or a small hoe as often as possible, to keep the earth fresh and moist about them.

Seed, if it be good, should sink in water; in order, therefore, to save yourself the mortification of seeing your trouble lost by *not* seeing the young plant you expect; whenever the seed has been kept long, for more than a year or two, put it into warm water, and after suffering it to stand for a few hours, reject all that swims on the surface.

Seeds will retain their power of growing for very different periods of time, some will retain their *vitality* for ten, or even twenty years, while others require to be sowed as soon as they are ripe; all seeds, however, are better for being sowed in the spring following the autumn in which they ripened, when they do not require to be sowed at once, and left in the ground for the winter.

The time which seed requires to lie in the ground before it comes up, varies greatly; some seed, as the rose, for example, lies two years in the ground before it germinates; while some, as the common cress, used for small salad, is up in two or three days.

When the weather continues very dry for some time after sowing, it is advisable to water the earth where seed lies, for moisture is essential to germination; the smaller the seed, and therefore, the nearer the surface of the earth, the more this is necessary, because the mould near the surface, of course, dries first. This watering should always be done with a watering-pot gently, so as not to wash away the mould from the seeds.

To keep the birds away from scratching up newly-sowed seed, some coarse white worsted thread should be stretched from bits of wood over the spot; this is found to be as effectual as it is cheap and simple.

MARY here remarked to her brother "that it was a slight drawback on the pleasure of gardening; that it caused the poor little birds to be viewed with jealousy, because they did so much mischief."

*Henry.* Some birds do much mischief in gardens, by scratching up newly-sowed seed, and by eating off the young plants and buds when they first appear; and gardeners are obliged to take great precautions against their depredations; especially in the beginning of spring, when food for them is scarce, and they eagerly hunt after all supplies; but the contrivance of the thread answers tolerably well, and is easily practised. Luckily for the birds, gardeners dare not shoot them, for fear of injuring their plants by the shot, as much as the birds themselves would do. Guns frequently fired off, charged with powder only, will, however, frighten them away; and a cat, if allowed to run about the garden, will also be a good protection.

*Mary.* But puss would do as much, and more, mischief, than the birds, for she would not be nice as to not running over the beds, instead of keeping on the paths.

*H.* Cats are so active and agile, that they do little damage by that, and their instinct prevents them, unless frightened, from ever treading down a growing flower; they will run in and out, among the plants, at full speed, and hardly touch them or leave an impression of their paws; but still they do some little harm, by scratching now and then; and if *valerian*, or cat-mint, be in the garden, they will spoil it by rolling upon it, being very fond of the smell of these plants. Cats, too, eat herbaceous matter occasionally, like dogs, at least I know they are great enemies to young pinks; but, however, with all that, puss is a less formidable foe than the sparrows.

*M.* Why do you say their instinct prevents them from treading on the flowers? Why should their instinct lead them to avoid doing what can only annoy us?

*H.* If you ever observed a cat walking on ground strewed thickly with different things, you must have noticed that she always picks out her way, so as to avoid setting her foot any where, if she can help it, except on the solid floor or earth: the whole tribe are a suspicious race, and the same instinctive lurking manner, which enables them to surprise their prey, appears to teach them to anticipate treachery towards themselves.

*M.* I remember reading, that the sense of feeling in a cat's whiskers is very acute, and that, in the whole race, these feelers are long enough to tell them, that wherever they can put their head through, without touching the sides of the hole with their whiskers, their body can follow.

*H.* I believe it, because I have often seen cats put their head through an opening, and then withdraw it, without attempting to proceed, as if trying, by the means of these hairs, whether there was space for their body; and, I suppose, when they do not make the attempt, it is in consequence of the information they have gained by this means.

*M.* What birds do the most mischief in gardens?

*H.* Sparrows, chaffinches, bullfinches, greenfinches, blackbirds, and perhaps some others; but it is only those that feed on grain that do any damage; for the soft-billed birds, as they are called, from living on insects, not only do no harm, but do a great deal of good, by destroying grubs, caterpillars, worms, and other things which are very mischievous in gardens of all kinds.

*M.* Does the common earth-worm do any mischief, besides the injury it does to gravel-walks and beds by its *earth-casts.*

*H.* None whatever, that I know of; they are generally most abundant in rank, cold, clayey soil, and such is bad for flowers; but I believe they do not add to the evil at all.

*M.* Then why did you sentence the worm to be the prey of birds?

*H.* I only meant the wire-worm, which is so destructive to plants of certain kinds, by eating their roots; but I am not sure that birds can get at these. It is only in kitchen-gardens and orchards that birds or insects are very mischievous; we need not apprehend much for our flowers. We will not grudge a few young plants for the former, it is but sowing a little more seed at first, and we will watch and remove all caterpillars, slugs, and insects that are injurious or unsightly. Now read on.

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All plants are raised either from *seed*, by *cuttings*, by *pipings*, by *layers*, by *parting the roots* of plants already grown, or by *offsets*.

All plants *may* be raised from seed, and vast numbers can only be so raised, but most perennial plants, those which grow and live, flower, and produce seed frequently and for many years, are better and more readily raised in the other modes, which will be now described.

*Cuttings* are young, full-formed shoots, taken off from a healthy plant by a sharp knife, just below the *knot** where a bud or leaf is produced; this cutting being set in a pot, in fresh fine mould, or in the open ground, will send forth roots, and grow into a plant the same as that from which it was taken.

It is known as a fact in Botany, that if any part of the *stem* of a plant be cut off, and one end of it be planted, roots will spring out from those parts, where leaves would have been produced if the part had remained on the parent plant, provided one or more buds are left on the cutting. But some plants send out roots when thus treated much more readily than others, and some will not succeed at all in practice. These differences depend, apparently, on the nature of the wood; those plants which have hard wood will not succeed well, while the soft woods furnish roots readily. If a cutting of an oak, for example, were planted, the root would not be formed quickly enough to furnish nourishment to it, and the young shoot would die; hence oaks are never so propagated. On the contrary, a young shoot from a willow will thrive rapidly, because roots are produced abundantly from the extremity when planted.

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* See *Elements of Botany*, p. 24.

For the same reason that shrubs and trees require pruning and lopping when transplanted; a cutting, to thrive, should not have many joints, knots, or buds on it; for if it have, the sap is exhausted in supplying the buds formed at these places, faster than it can be furnished by the tender fibres of the newly-forming root.

Hence the less readily the roots are formed, the fewer buds should be left on the cutting. Nothing but experience or verbal instruction can teach a beginner the right mode of proceeding, as to whether the cutting should be from a young shoot, the wood of which is not quite formed, or from a *ripe* shoot as it is termed; that is, from one more than a year old.

The cuttings when taken, should be planted in a clean pot filled with fresh mould, and as many may be put in, as the pot will conveniently hold round its outer edge, without crowding. If the cuttings succeed, they should be transplanted singly into new pots, as soon as they begin to form roots; if the buds at the joints increase, and seem healthy and thriving, it is a sign that roots are forming, and that the cutting will live.

There is nothing prettier than a clean pot of fine sand filled with the minute cuttings of heaths, and covered over with a bell-glass or tumbler, each cutting being a plant in miniature, often having a blossom on it.

It may be here mentioned, that *in all cases*, flower-pots when used should be clean, free inside from old hardened mould, and should be filled for about one fourth of their depth with stones, or dry clean rubbish of any kind, to drain off the water, which would otherwise lie in the bottom of the pot, and rot the roots of the plant put into it. Pots should be placed on a stand to keep them dry, or if set on the ground, this, if it be not gravel or paving, should have some ashes spread in a thin bed for the pot to stand on; this prevents worms from getting in.

Generally speaking, cuttings should be taken and *struck*, as the planting them is termed, in the spring, when the sap is in full activity; this allows of their forming roots during the summer, and then lying dormant in winter, as all plants do, or ought to do. If, on the contrary, the cuttings were struck late in autumn, the effort to make roots would keep the plant in active vegetation during part of the season when it ought to be at rest, and this weakens and exhausts it.

It is best always, if possible, to cover cuttings with a hand-glass, and this should be pressed down on the mould so as to exclude the air, because by so doing the moisture in the cutting is kept in it, and furnishes all the nourishment possible to the buds and new roots, while, if the cutting were exposed, this moisture would be carried off by evaporation faster than it could be supplied. For similar reasons cuttings should not be much exposed to the sun, though they should have abundance of light: they should be watered but sparingly, except at first putting in, when a good deal should be given gently to settle the earth closely round the newly-cut end, unless this is the case, the roots will not form; as was mentioned in speaking of sowing seeds. The glass must be raised occasionally to change the air, for fresh air, that is, air containing oxygen gas, is essential to every part of a plant, and plants contaminate the air they live in by absorbing the oxygen; though leaves, when exposed to the rays of the sun, emit oxygen.

If new roots could be produced on the shoot before it was separated from the parent plant, it is obvious that the requisite nourishment would be furnished to the shoot from the latter, during the formation of the new roots, and the young plant would not be left solely to these for support. This is the object of the process of propagating by *layers*, practised with all shrubs or plants, which either do not succeed by cuttings, or which from their growth can be readily multiplied by this second mode of treatment. A layer is a shoot of a plant which is bent down to the earth, and held down at a joint or bud, buried a little way in the mould, so as to form roots there; when these are so formed, the shoot is then cut off from the parent stock near to the new roots, and the shoot thus furnished is removed to the spot where it is to be planted.

In order, however, to form roots quickly, it is necessary that the inside of the stem be exposed to the ground; this is done in a cutting by the act of separating it from the plant, but as the layer remains attached to the parent, the bark of the shoot would prevent roots from forming readily, unless a wound was made at the joint. This, however, is not absolutely necessary, especially if the layer may remain for a year, or more, attached to the stock.

Suppose it was a young standard tree of which a layer was required, the process is as follows: having dug and raked the ground well at the proper spot, bend down a branch that will bear it, till its extremity touch the earth, laying this in a shallow trench made on purpose; fasten it down by a forked peg or two, so that the elasticity of the branch may not cause it to fly up again; cover all the part touching the earth with raked or sifted mould, to the depth of eight or ten inches: then cut off, with a sharp knife, all the twigs or young branches that stand upright out of this newly-laid ground, leaving only two or three knots or joints to each standing out of the earth; water the whole well, and lay a few moderate-sized stones on the ground between the shoots, these will not only serve to keep the branch down, but will also keep the earth cool and moist under them.

In a year, if the branch was *laid* in spring, the shoots may be cut off by sawing or cutting the branch between them, and then they may be planted out as new trees; each will be found to have a good tuft of roots at the joint where it sprung from the parent branch.

It will be better to cut a notch pretty deep into the branch at each joint, when it is first laid; this will accelerate the formation of new roots.

If the branch of the tree be so stiff as not to bear bending down to the ground without breaking, which must never be done, then a box filled with earth, may be raised on any stand to a convenient height, and the branch *laid* in that, notches being cut in the sides to admit it. When this is done, however, the mould must be watered more frequently, because it will dry soon in a small quantity, such as a box will only hold.

The process for *laying* smaller plants, is just the same, only it must be performed with proportionably greater care and neatness. Florists propagate carnations by layers, in July, as follows: the ground round the plant selected is moved well, but carefully, with a small hoe or rake, a compost prepared of fresh mould, with equal parts of rotten cow-dung or dung from an old cucumber-bed, which has been well mixed together and left to mellow for eight or nine months, being frequently turned over in that time, is laid evenly all round on the newly-raked earth. The stalks intended to be laid, are prepared by having a sharp knife put through them, one inch below the third or fourth joint from the blossom, and a slit is made upwards to the joint, so as to cut this nearly half way up; the stalks are then bent down, and fixed by a small forked peg in a drill, made with the finger, sufficiently long to receive the slit and a portion more at each end of it; cover the whole over with the compost and press it down with the hand. A few leaves should be stripped off from the bottom of the shoot, and an inch from each of those at the top of it.

No shoots should be selected for laying, that have begun to send out side-shoots; the reason for this caution is, that these side-shoots would draw away the nourishment which ought to go to the layer, and enable it to form roots.

At the end of August the layers may be cut off from the parent, potted in fine mould, and set in the shade till they recover; or they may be planted in open beds, taking care to cover them over from wet or frosts, by matting spread on hoops; but it is better to leave some layers uncut from the parent plant all the winter, and plant them out in the following spring where they are to grow; these will be stronger, and will therefore bear transplanting better.

*Pipings* are only *cuttings*, but the term is used of herbaceous plants, and when the cutting is smaller and more delicate than a common cutting: the following mode of propagating Carnations, by pipings, will explain the mode of proceeding for all other plants which are so raised. At the beginning of July cut off the two top joints of good shoots by a sharp knife; pare off the thin bark from the lower end, immediately below the bottom joint, for about a quarter of an inch, and split it up for the same distance; cut off the bottom leaves: then put the pipings for an hour or two in a basin of water. Prepare a place in an open border, but better still in a hot-bed, by raking the surface of the compost fine and smooth; press down on it the hand-glass which is to cover the pipings, so as to mark the earth; then taking this off again, make the requisite number of small holes with a stick, sufficiently within the mark of the glass to prevent this, when put on, from touching the pipings which are outermost; these must next be put in, and the earth pressed down, watering them gently to settle the mould round them; when they are dry, put the glass over them again in precisely the same mark, and press it down into the earth so as to exclude the air; the sun may be allowed to shine on them for an hour or two, but skill and care is required for two or three weeks in giving the young plants only the proper quantity of light, air, and water; if there be too much of this last, or the glass be replaced before the plants are dry again, they will become mouldy from being shut up from the open air; it is better indeed to water over the glass every morning, and not to move it at all for ten or twelve days, and then raise it for an hour or two in the morning to air the plants, if the weather be dry and fine, and between the showers in wet weather; this airing frequently, and not shutting up while the stems and leaves are wet, being the two principal things to be attended to. In about six weeks from the beginning, the plants will be ready to be potted off into separate pots.

Pinks, scarlet Lychnis, double-rockets, wall-flowers, rose-campions, sweet-william, Indian pinks, and Alyssons, are best propagated by pipings or SLIPS, which are young shoots pulled off close to the stem, and then the rough end smoothed a little with a sharp knife.

*Mary*. All that nicety must be entertaining, I like things that are not really difficult, yet require care; it is so pleasant to watch the success of your own labours; but I suppose with all care the layers of large shrubs or trees sometimes fail, because they cannot form roots.

*Henry*. Of course not so often as cuttings, for the reasons that induce us to prefer layers; and I believe that failure in any case only arises from want of care, unless some insect has attacked the tree, and injured it seriously. But we shall not attempt for a long time to *lay* shrubs and trees; we will, however, since you like it, have plenty of the commoner kinds of pinks and carnations, and raise new ones by layers, if we can find time; but you will not be able to do much this summer, for we shall have enough to occupy all the time we can spare in getting our garden into good condition, and keeping it free from weeds, which will come up thickly in new earth.

*M*. I must try to learn to know the weeds well, that I may not pull up young plants instead.

*H*. I will show you the weeds when we meet with them; but if a garden be well planted, the regularity with which the true flowers come up, causes them to be easily distinguished from the weeds. But there are some weeds, as they would be called, which I shall be glad to see, for I mean to put them in pots, and try to rear them for their beauty.

*M.* Which are they?

*H.* There is a tribe of plants, called *Orchideæ*, which are beautiful and curious; and I suspect that two or three of these are natives of this neighbourhood. After you went to bed last night, Mr. Wentworth was talking to papa a great deal about botany, and *herbaria*, which are plants dried between paper, so as to keep for many years. Botanists form collections in this way; and Mr. Wentworth has a fine one, which he has promised to show me. Well, he was talking about Orchises, and what beautiful ones he had seen in South America; and he says that there is a very rare English one, which used to be found upon chalky hills; now I mean to hunt well when summer comes, to try and find it, and I am sure there are others which we shall find, such as the ladies'-traces, the bee-orchis, &c.

*M.* Are these plants more beautiful than others, or what is it that makes you wish to find them particularly?

*H.* They are beautiful, though not more so than many other common flowers, but they are singular in their mode of growth, and they are not common, and that makes people seek after them.

*M.* I shall be glad to see them, and I will help you to hunt; and what I shall be still more glad of is, that mamma tells me that in studying botany, and examining and hunting for wild flowers, we may, if we pay attention, learn a good deal about insects.

*H.* I know it, for I heard papa and Mr. Wentworth say that certain insects are always found near, or on certain plants only, and that a botanist may be much assisted in his pursuits by a knowledge of Entomology.

*M.* What does that hard word mean?

*H.* It means "discourse about insects," and comes from the Greek, like geography, geology, and most scientific terms. But why do you call it a hard word; what do you mean by *hard* word; is it hard to pronounce, or what?

*M.* No; it was a foolish expression, but we often call words hard, merely because we do not understand the meaning of them.

*H.* I am glad you own it is foolish, for I think it so; our own language is not capable of furnishing scientific terms, so expressive, so short, or so agreeable, as the Greek and Latin; and it is absurd to object to, or ridicule the adoption of such words, when more than half of those in common use are equally derived from those languages, or from others. I heard a person protest against such terms as barometer, photometer, ophiology, &c. &c. &c., as *repugnant to the genius of our idiom, and meriting expulsion from literary productions*, unconscious that all the words of more than one syllable, which she so affectedly made use of, were every one derived from Latin or Greek.

*M.* Well, but to return to insects: we will observe them, then, whenever we are gardening or walking, for they are very curious; I remember standing for a long time, watching a spider take out of her web some bits of dead leaves, which the wind had blown into it, and I admired how cautiously she proceeded, injuring her work as little as possible, and then repairing it with care and diligence.

*H.* True, and we shall learn far more astonishing actions of insects than that; but do you know that spiders are not insects?

*M.* No! What are they then? for to use your favourite logic, they are not quadrupeds, nor birds, nor fishes, nor reptiles, nor worms, nor plants; and I thought every living thing must belong to one of these divisions, or to insects.

*H.* That depends on the mode in which you classify those living things, and now that so much more is known of natural history, the old classification is not correct enough.

*M.* Pray tell me, then, how living things are now divided into classes, and where spiders come among these.

*H.* The very obvious and natural distinction between animals and plants is, of course, still preserved; though both are organized, and therefore form together a division distinct from minerals.

Animals are arranged under four great divisions: First, *Vertebral animals*, or those having a *back-bone* and complex skeleton of bones within their body. Secondly, *Molluscous animals*, or those having no internal bones, but a *soft body* enclosed in a hard shell, as oysters, cowries, and all the beautiful shells you have seen in cabinets. Thirdly, *Articulated animals*, including those having no internal skeleton, but a kind of horny case, which is in separate pieces admitting of motion, as if *hinged* or *jointed*, hence the name.

Lastly, *Radiated animals*, the structure of which bears some resemblance to the spokes of a wheel in symmetry, and in proceeding from a central axis: the common star-fish and the echini are good examples of this class. But you must not suppose that these are the only characters of these divisions, each kind of structure is accompanied by many anatomical peculiarities respecting the lungs, stomach, and nervous system; but I do not understand these myself, and therefore cannot explain them to you.

*M*. Now in which of these divisions do spiders come, and insects?

*H*. Think a little, and you will soon see.

*M*. Neither of them are vertebrated, nor have they a hard shell like a cockle, nor are they radiated like a star-fish; so of course they are included in the third, or the articulated.

How are spiders distinguished from insects? both being articulated.

*H*. The division is subdivided into four classes. The first, called Annelidæ, or *ringed*, as worms, leeches, and such animals; secondly, crustaceous animals, or *shelled*, as lobsters, shrimps, and so on; thirdly, spiders; and fourthly, true insects, as flies, beetles, grasshoppers, and so on. Now these last two classes are distinguished from each other by their mode of breathing, and other anatomical peculiarities.

*M*. Thank you for all that you have told me; which I will recollect; and now we will go on with our "cultivation."

MANY perennial plants are propagated by dividing the roots, and all that have more than one stem may be so treated; this is effected by taking up the plant carefully after it has done flowering for the season, and separating one or more stems with the portion of roots belonging to it or them. In some plants the separation is best done by pulling the root in two, others, as anemonies, require to be cut by a sharp knife; the reason of this is, that these kind of roots being much matted together, it would be impossible to pull them in two without tearing the stem away, or injuring the fibres more than cutting would injure them.

If the plant be one, the stems of which die down in the autumn, then the root must be separated between where the stems have been, so that each part may have a *crown* to it, that is, the place where the stem rose from.

Those plants which have tuberous roots, producing offsets during the summer, must be treated in the same way; each tuber will produce a stem if taken off from the parent root.

The most remarkable tuberous roots which form offsets, are those commonly called bulbous, but more properly *bulbiferous* for the bulb is not a *root* but a bud.

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*Mary.* What, is not a hyacinth-root a root?

*Henry.* A hyacinth *root* is a *root* unquestionably, Mary; but what you call a root is not all root, but one producing a bud on its upper part. You have often seen an onion cut in two, and must have noticed that it was composed of rings, which surrounded each other and came asunder easily. Now these rings are the bottoms of the leaves of the plant, which are enclosed in this as in any other bud, and would grow into long leaves, sheathing or embracing the flower-stalk which rises from the centre; for many bulbiferous plants are stemless. The real root of the onion, or hyacinth, is the thin flat plate at the bottom of this bud, and which is a tuber, having the fibres descending from its under side; but this true root, and the bases of the leaves composing the bud, are inseparably united, and cannot be distinguished from each other.

*M*. I understand that, and it seems, now one is told, very obvious that the onion and hyacinth are buds, but are the crocus, and the tulip roots also buds?

*H*. No, for they are solid and do not consist of the bases of leaves, or leaves in a young state, as true buds do; these solid bulbs, as we may call them, are really a species of stem.

*M*. But, I suppose the lily, and the garlic bulbs are buds, and the scales which compose them are the bases of leaves which do not surround the stem.

*H*. Exactly so, and what proves that this is the case, is, that real buds are formed in the angles of these scales, just as buds are formed on trees and shrubs, in the angle formed by the stalk of a leaf.

*M*. But though these bulbs are really buds by their structure, they differ from all common buds in being on the tops of the roots, or in having roots at their under side.

*H.* You know the primrose and leontodon are stemless plants, and have their leaves springing from the top of their roots, now buds are formed every year in the angles of these leaves just as in those which are borne on a stem, these buds, therefore, like the hyacinth and onion, have the root on their under side. Moreover, you will be surprised to learn that *all buds* produce roots from their under side, for it is now known that the woody fibres, of which the solid trunk of trees is composed, is made up of the fibrous *roots* of all the buds produced above it; the woody stem of a perennial shrub or tree is, in fact, a mass of root-fibres, but you will understand this better when you have learnt more botany from mamma. In this way also, is the necessity for leaving two or three buds at least on cuttings, explained. For the fibrous roots of these buds descend through the bark of the shoot, and form the new roots by which the young plant is to be supported.

The crocus produces offsets, which by being separated every three years, and planted, produce new plants; the offset of this species of stem is analogous to the runner of a stemless plant, or the sucker of a shrub, and will propagate the plant for the same reasons, by producing new roots if planted.

*H.* Mary, Mary, come and see the capital set of gardening-tools our Aunt Elizabeth has sent us, we shall be quite set up, there are some intended on purpose for you to use, come along directly, they are all put into the garden tool-house, where we will always keep them.

*M.* Oh, I want very much to see good gardening-tools, and to have their use explained to me; I only know a spade, and a rake, and a hoe, and a watering-pot, and garden-shears.

*H.* Why then you know nearly all that are essential, for though there have been many ingenious contrivances for cutting and gathering fruit and flowers, and other purposes, yet they are only used in very extensive and highly-cultivated gardens, and not always there.

*M.* Well, we wanted the commonest, and most useful kinds, very much; for those used in the great garden are too heavy even for you, and I could not use them at all.

*H.* That is just what made my Aunt send us these, there is one of each, made light and small for a little girl, and those for me are not so heavy as papa's.

*M.* I will get my hat and gloves, and go with you directly.

*H.* Now Mary, if you had never seen any gardening-tools at all, supposing that you knew a little about botany and gardening, what sort of tools would you invent to accomplish what you knew must be done, for digging, and turning the earth, breaking it small, and smoothing the surface.

*M.* Having seen the tools used for this purpose, I cannot easily imagine any other form; are they not well contrived? though of course they must be, or others would have been invented long ago.

*H.* You have seen the gardener and others dig, do you not think it might be better if the handle of the spade were longer, so that he need not stoop so much? Stooping, you know, tires the back.

*M.* Yes, I think it would, and then too it would require less effort to turn up the spadeful.

*H.* *Spitful,* if you please.

*M.* Well, spitful of earth—why are not the handles of spades made longer.

*H.* Because though the digger would gain in the two respects you have mentioned, he would lose in another, and more important one. If the spade were longer, so that he must stand upright to use it, he could only *push* it by the strength of his arms into the ground, and that would be using his strength disadvantageously, whereas if the spade be short and he stoop to use it, every time he puts it in the ground, he can throw the weight of his body, as it were, on the handle, and thus force it in deeper. Now as the spade must have been the first instrument ever invented, you may depend on it that by long experience, without even thinking about it, the best length has been attained, so as to produce the greatest quantity of effect with, altogether, the least labour. Well, here they are, see here is a middling-sized spade for me, and a small or *border* spade, fit for a woman, for you.

*M.* How neat!—I look at them with more

interest, after what you have just told me. Then if a man exerts his strength disadvantageously in pushing, the English hoe must be a better tool than the Dutch hoe.

*H*. So it is, where heavy work is to be done, but they are intended for different purposes; the English hoe is used for breaking clods, drawing up the earth round the stems of plants, as cabbages, celery, &c., and for turning up the ground and cutting up weeds between plants, where a spade would dig too deep, and move the earth too much. The Dutch hoe is principally used in lighter work of a similar description, but especially for weeding, which it enables the gardener to do without disturbing the ground so much as the other would do; it is used when standing upright, too, which renders it less fatiguing for women, than the common or *draw* hoe.

*M.* It acts like the *spud* which papa takes out with him into the fields sometimes, to root up the docks and thistles with.

*H.* It does; here is a very pretty little Dutch hoe for you, and one of each for me.

*M.* And here are two rakes; why we shall be well supplied: and a fork; what is that for?

*H.* That is for stirring the earth among flowers or plants that are thick together, it does not injure the roots so much as the hoe, by not cutting them; it also serves to take up roots of perennials for dividing or for transplanting, and forks are used instead of hoes, in stiff clayey soils, as being stronger. You know what this is.

*M.* Yes, a trowel, for planting and sowing of course, and a most essential tool it is in gardening. I have used that sometimes in helping mamma to garden, I used to make the hollows for her to put seeds in, which were sowed in patches.

*H.* Here is also a dibble for planting, but it is not so good a tool as the trowel, by forcing the—

*M.* You know you explained that to me in your observations on sowing.

*H.* Well, then, two watering-pots with a fine rose to each for watering delicate plants, and newly-sowed seed, and a splendid wheel-barrow for wheeling dirt, and weeds, and little girls in.

*M.* Bravo—then give me a ride in it directly.

*H.* Get in——there—now here goes.

THE brother and sister, though looking forward with pleasure to the time when they might commence sowing and planting, found too much occupation connected with their new favourite employment, to think the months of December and January tedious. Both studied botany diligently, and learnt all they could respecting natural history of every description, a pursuit in which they were especially encouraged by their judicious parents—as one tending to form virtuous feelings, fine taste, habits of observation, and above all, as one which would daily, nay hourly, turn their thoughts to Him "from whom all blessings flow."

A severe frost, which had continued till nearly the end of January, had put a stop to the few occupations which the garden otherwise would have furnished: anticipating this weather, Henry had been instructed to dig all his beds up rough, so as to expose the earth as much as possible to the action of the air, and he had laid straw and litter from the stables round the roots of all his less-hardy shrubs, matting over the stems also of those against his south wall; with these precautions, and owing to the circumstance of this being the back of the stable, he rejoiced to find, on the return of milder weather, that none of his American plants had suffered seriously.

The fluctuating weather, which usually succeeds a long frost, prevented any excursions in the fields till the latter end of February; but then, one morning promising a fine day, a promise which their father told them the barometer confirmed, Henry and Mary prepared to set off for a ramble, each provided with a hand-basket and a trowel, the professed object of their expedition being to get some roots of wild primroses, violets, anemonies, and other plants, to set in the borders, and under the shade of the shrubs in their garden.

*H.* Have you got every thing you shall want Mary?

*M.* Yes, there are only the basket and trowel, that I know of; you have your tin botanical box, have you not? though I do not suppose you will want it, there will not be many things to be got yet.

*H.* More than you think of, perhaps, but I have also brought it to carry some provisions; I guess we shall be hungry before we return. Let me see—here is my knife, my pencil, my book, a magnifying glass, a bottle, my stick, my basket, and two pill-boxes.

*M.* Why Henry, what are you about—what can you want all these curious articles for, especially the last; you will not take any physic in them I hope.

*H.* And my trowel—now come along. We will go round by the lane, over the common, and to the wood, and then back by the river. Are you warmly wrapped up? for it will be cold standing to gather plants and crossing the common.

*M.* Which do you think best, to warm oneself well at the fire before one sets off, or not?

*H.* If you are going to walk far and fast, it is better to set out warm, for then exercise will keep you warm; but it is very bad to go out warm, only to walk in the garden, or to stand still, because you feel the change more, and you are more liable to take cold. See here, Mary, here is a flower for you already; do you know what it is?

*M.* No, it looks like the common white deadnettle, only it is smaller and the blossoms are pink.

*H.* I believe it is of the same genus, and is called *Lamium purpureum;* it is one of the earliest of spring flowers.

*M.* The real nettle has a leaf something like it; does that belong to the same tribe?

*H.* No. This Lamium is a genus of the extensive and valuable order, called Labiatæ, which comprises, Mint, Lavender, Thyme, Sage, and Marjoram. It is an order which does not contain one poisonous species, and is characterised by yielding volatile aromatic oils, to which the plants belonging to it owe their fragrance.

*M.* Is there any more distinct character by which it may be known?

*H.* Yes, two; the plants of this order invariably have a square stem, and the flowers are produced in tufts, called whorls, in the angle of the leaves, as you see in this plant before us, and still more obviously in the white: by these two characters combined, you may generally distinguish the tribe; for though many others have square stems, yet the whorled flowers and that together are only found in this order, and then you must also recollect that the corolla of the flower is in one piece, or *monopetalous* and irregular.

*M.* Then the beautiful splendid Sage which we admired last summer belongs to this order.

*H.* It does, there are no trees belonging to it, and it does not furnish food to man, in the proper sense of that word, for the herbs we mentioned are only sauces.

*M*. How beautifully that Robin sings.

*H*. I think it is a linnet, the Robin's song is not so varied.

*M*. I hope the linnet is not one of the mischievous birds in gardens.

*H*. No. I believe it is innocent enough, it is said to be particularly fond of linseed, and that its name is derived from that circumstance, but I do not know that it does much harm to the crop.

*M*. What is linseed?

*H*. The seed of the plant which is manufactured into flax, *Linum usitatissimum*.

*M*. Are linnets birds of passage, or do they winter with us?

*H*. They winter here, and are seen congregated in large flocks in severe weather; it is a pretty bird as to form, but not brilliant in colours.

*M*. It seems as if the same bird seldom possessed both beauties, that of plumage and that of song.

*H.* You forget the goldfinch, whose song is not to be despised; I rather think your assertion would not be found strictly correct, except so far as this, that the birds of hot climates do not sing much, and that they have the most splendid plumage.

*M.* But our English birds, which sing the sweetest, are generally the least gay in their colours. Except the goldfinch, I do not remember any that are so.

*H.* Why, we have but few birds that are brilliant in colours at all; there is the kingfisher and the jay, the partridge, the chatterer, the hoopoe, the goldfinch, chaffinch, bullfinch, and the titmice, are all pretty birds. The chatterer and the hoopoe are rare birds in England; but there is another still rarer, or only an occasional visitant, which far surpasses them in beauty, the roller, called also the German parrot.

*M.* What plant is this growing under this shady hedge; I have been looking at it, and I find the flowers have no pistil.

*H.* It is the Dog's-mercury, *Mercurialis perennis*, and is what is called Diœcious, that is, the male flowers are on one plant, and the female on another.

*M.* Show me a female plant.

*H.* Possibly we may not find one near here; they do not often grow in the same place.—When we get into the wood we may, perhaps, for it abounds there.

*M.* Is it used for any purpose?

*H.* Not now, I believe; there are much better medicines. It belongs to an order which is remarkable for including plants containing the most violent poisons, the most useful medicines, that invaluable substance Indian-rubber or Caoutchouc, and box. You know the common spurge, that is such a troublesome weed in gardens?

*M.* Yes; you mean the plant out of which a white milky juice flows when the stalk is broken: the old women in the village say it cures warts.

*H.* I do; all the plants of the order have that milky juice, which is *acrid*, or burning to the taste, and even corrodes the skin sometimes. That common spurge is called *Euphorbia*, from the name of the physician to an African king, in the time of the Romans; and the order of plants is called *Euphorbiaceæ*.

*M.* Besides this Mercury, the common box, and the spurges, what other plants belong to it;

and which plant is it that produces the Indian rubber, and what part of the plant furnishes such a strange substance?

*H.* Many plants of the order furnish it: it is the juice which flows from the stem when it is cut, thickened by exposure to the air: It is white when it flows, and is blackened by being smoked in order to dry it while it is being made into bottles on moulds of clay. The mould is covered over with a succession of layers of the fluid juice; each dried over a fire: when a sufficient thickness is obtained in this manner, the mould is broke, and the pieces pulled out through the hole left for the neck. You have seen thick pieces of Indian-rubber, which were white in the middle; well, that arises from the juice being dried in a different manner, and not smoked, and obtained from an Asiatic genus of the order, the common thin black being manufactured in South America.

*M.* They make shoes of it now, and tubes, and when spread in a fluid state on silk or cloth it makes it water-proof.

*H.* Papa says that it is not yet applied to half the purposes it might, it being only a recent discovery, not more than a century having passed since it was well ascertained what it was.

*M.* Stop now, for here we are in the wood, and I think I see a primrose.

*H.* Then, if you will carry the basket I will dig them up, because I can do it better than you.

*M.* Oh look, here are plenty, what beauties; I suppose I may gather a few for a nosegay besides.

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HENRY proceeded to his work, and got up a dozen or more of fine roots, while his sister wandered away in search of flowers: she presently returned with a flower imperfectly blown, in her hand, exclaiming,

See, Henry, here is a hare-bell; this is the only one I can find blown, but there are plenty in bud; do let us take some home for our garden, besides the primroses.

*H.* We will so; I came for them as much as for these primroses; but where is the basket to put my roots in. You must take your flowers out or they will be crushed; I will put them into my botanical-box for you, they will keep better there.

*M.* But what are we to do with the provisions? you forget those.

*H.* So I did; why, I will tell you, we had better sit down and rest, and eat them up, and then they will be out of the way.

*M.* And here is a nice mossy seat at the foot of this tree, so let us see your stores.—What a variety of plants are to be seen even in such a small spot as this; there must be more than a hundred species in sight now.

*H.* You would not find so many distinct species as you suppose; nothing like a hundred, even if you were to count all the mosses, and lichens, and fungi. The mind is deceived by the eye; the real variety of form and colour of the separate trees and plants dazzles us, as it were, and makes us think there is a greater number of species than there really is.

*M.* Ay, you philosophers are always counting, and measuring, and weighing, and bringing every thing to the rule of reason.

*H.* So much the better, if by so doing we keep the fancy of folks from running away with them, and exaggerating what they see and hear.

*M*. By the bye, I remember now, in explanation of what you were saying of the variety of forms deceiving us as to the number of objects, that once on my saying to papa, one fine night, what thousands of stars were in the sky, he told me that in the clearest nights not more than 1000 were ever visible to the naked eye at once.

*H*. True, and that is well remembered by you; when we go home I will make out how many species of plants there are really growing in this wood.

*M*. What pretty stuff this moss is, if it be moss; but now I look at it I do not think it is what you botanists call a moss.

*H*. It is not; real mosses are much smaller, and do not grow in this tangled manner. I know two or three mosses, having often looked at them to admire their curious little cups and stalks: a tuft of them in blossom is beautiful.

*M*. You see them in plenty on the garden-walls; their leaves are velvety, and of a bright green: how many different species of mosses are there?

*H.* About eight hundred, I believe.

*M.* What, eight hundred distinct species of such little things! Why, how many species of plants are there all together?

*H.* Why, I believe there are nearly eighty thousand known and described, and probably there are ten or twenty thousand more not described.

*M.* No man's life would be long enough to learn to know them all.

*H.* Nor is it necessary or advisable that any body should try to do so, by means of classifications that useless labour is saved.

*M.* Tell me how classification is applied.

*H.* I will as well as I can, by means of a play. Think of something, but do not tell me what it is.

*M.* Well, I have.

*H.* Now I will find out what you have thought of, by questioning you without asking its direct name. Is it organic or inorganic?

*M.* It is organic.

*H.* Is it animal or vegetable?

*M.* It is animal.

*H.* Is it vertebrated or invertebrated?

*M*. Vertebrated; that is, it has a back-bone and internal skeleton.

*H*. To which of the following classes does it belong. Mammalia, or animals that suckle their young, birds, reptiles, or fishes?

*M*. To the first I think, let me consider; it is not a fish, nor a bird: how are reptiles distinguished from quadrupeds?

*H*. Reptiles are also quadrupeds, or four-footed, generally; but Mammalia are all viviparous, or bring forth their young alive, while reptiles lay eggs like birds, and have cold blood.

*M*. Oh, then, the thing I thought of is warm enough, and ——, in short it belongs to the first class.

*H*. Well then, now for it. Is it *Bimanous*, or having two hands: is it a man?

*M*. No.

*H*. Is it *Quadrumanous*, or can it use its hind-feet as hands as well as its fore-feet, as monkeys, apes, lemurs, can?

*M*. No; it is none of these.

*H*. Is it carnivorous, that is, does it belong to that order which includes animals of prey, as lions, tigers, dogs, wolves, and so on?

*M.* It does.

*H.* We, neither of us, have sufficient knowledge, I am afraid, for me to go on, because we do not know all the genera of that order; but I'll try. Does it belong to the cat tribe?

*M.* Exactly.

*H.* Oh I know, it is your cat; but you can understand from this, that if you had thought of some foreign animal, however rare or singular, and if we had sufficient knowledge, I could go on questioning you till I had brought you to the genus, species, and variety. In the present case, you had thought of the VARIETY, *domestic cat;* of the SPECIES, *cattus;* of the GENUS, *Felis;* of the ORDER, *Carnivora;* of the CLASS, *Mammalia;* of the DIVISION, *vertebrata;* of the *animal kingdom.*

*M.* Now let us try again, and I will think of a plant.

*H.* We should find greater difficulty still, for certain divisions of the vegetable kingdom contain so many genera that I could not discover even the genus, still less the species you had guessed; for instance, suppose you had guessed a sweet-pea, I could discover by asking you that it was a flowering plant; dicotyledonous, polypetalous, with hypogynous stamens, distinct carpella, superior ovarium. But there I should stick, for there are many orders of plants to which these characters would apply; and suppose I went on, and found out, by questioning you, that it was of the order Leguminosæ, that order contains, I think, more than three thousand species, so that it would be impossible to arrive at the species you guessed, without more knowledge than I am ever likely to have.

*M*. True, but these examples have shown me the importance of classification; and now let us go on with our work.

*H*. I will put the primrose-roots at the bottom of the basket first, and then we will go and get up some hare-bells.

*M*. What genus and species is the hare-bell.

*H*. First tell me what class it is, I mean whether it is monocotyledonous or dicotyledonous.

*M*. How can I do that without looking at a seed? and the plant is not yet in blossom.

*H*. Do you forget what papa told us, about the leaves of monocotyledonous plants not having their veins *reticulated*, or in net-work, like the leaves of dicotyledonous plants?

*M.* O yes! true; well then the hare-bell is monocotyledonous, obviously; the flower resembles a hyacinth.

*H.* It is a hyacinth, *Hyacinthus non-scriptus*, which means *not written*, because another species that is cultivated, was fabled by the ancient poets to have the name of Hyacinthus, the friend of Apollo, written on the blossoms; for after his death he was changed into the flower, so botanists, to distinguish this wild species, called it *non-scriptus*.

*M.* That seems to me to be but a bad reason for giving it a foolish specific name; I think the specific name ought to express some character of the plant, as *round-leaved*, *square-stemmed;* or of its place of growth, as *alpine*, *marsh*, and so on.

*H.* Undoubtedly those are the best; but you must recollect how difficult it is to find sufficient variety of names, especially for extensive genera; so you should not be too severe on the botanists who gave this plant a name, not so rational as you could wish.

*M*. By the bye, I do not recollect seeing the hyacinth mentioned in your list of plants; cannot we have some in our garden.

*H*. The bulbs are too dear for us to buy, and they require too long a time to raise from seed; but if we can get a few given us that have been exhausted from blowing in glasses, they will do pretty well afterwards in the open ground, if taken care of; but they require a particular compost, as it is called, of garden-mould, decayed leaves, and rotten cow-dung, and protection from the sun and rain, so that we could not spare time enough to grow fine flowers. You know papa almost made it a condition with us, that we should not attempt to grow what are called florists' flowers, except of the commonest kinds.

*M*. I suppose these are called *florists'* flowers from the emulation among the gardeners to produce the finest kinds; what are they?

*H*. Skill and care in cultivation is proved, or is supposed to be shown, by obtaining full, double flowers, of a symmetrical form, large in size, and rich and varied in colour; consequently the flowers which are made the objects of especial care, are usually those which admit of these improvements being most displayed on them.—Double flowers are only produced from plants with many stamens, because you know that it is by the conversion of the pistils and stamens into petals that flowers become double. The anemone and ranunculus, as polyandrous, have long been favourites for cultivation for doubling; and the auricula, primrose, polyanthus, cowslip, are favourites for form and colour, because, having only five stamens they do not become completely double, or so full, as the former; mignonette, balsam, hydrangeas, campanulas, lobelias, rockets, lily, fritillary, iris, crocus, ixia, gladiolus, tuber-rose, and amaryllis, are also considered florists' flowers; and the carnation, the pink, the tulip, hyacinth, narcissus, the chrysanthemum, pæony, geranium, and the dahlia, are much attended to.

*M*. Are hyacinths troublesome to manage?

*H*. In October the bulbs are put into drills, made in a rich soil, composed of light mould, clean sand, and rotten leaves, well mixed together and made fine. The drills should be five inches deep, the bulbs not closer than six inches to each other every way; and some sand should be first strewed at the bottom of the drill under each root, and over the bulb, when put in, the earth is then to be filled in, so as to bury the bulb three to four inches below the surface; in doing this, care must be taken not to throw the bulbs on their sides, for they should stand precisely upright. This is a better mode than making holes with a blunt dibble, for reasons I have mentioned to you before.

During open weather do nothing but keep the bed free from weeds, and clean; but when any frost comes, dry straw, or litter, or mats, must be spread over the bed, sufficiently thick to guard the bulbs effectually from freezing: but remove this shelter as soon as the frost is gone. When the flowers begin to appear in March or April, shelter against the sun must be provided, or the flowers will quickly fade; and wind and rain also injures them. This shelter is best afforded by canvass laid upon a light frame of hoops, stretched over short stakes, stuck round the bed five or six feet apart: these stakes may have an iron peg stuck in their tops, which will pass through a hole in the hoop made to admit it, as you have noticed of the heads of tentbedsteads. With these precautions, and the additional one of tying the spikes of blossoms to neat sticks, to prevent their weight from bending them down, the bed will long continue in beauty.

I need hardly remind you that care must be taken, in planting the bulbs, not to put two of a colour together, or at least to keep some uniformity in this respect, whether there are only a dozen or a hundred.

*M.* There is no chance of our getting enough to make a bed, so we may put what we do get in our borders.

*H.* Yes, we have only to prepare the spot in the same way; and the roots are better put in a clump of five or six, at about as many inches apart.

*M.* After the flowers are over, do you leave the roots in the ground?

*H.* No; they must be taken up, cleaned, and put away in a dry airy place, till October again; the offsets, which have been produced, must then be separated from the parent bulb, and planted separately.

*M.* Why are hyacinths and other bulbs exhausted by blowing in glasses?

*H.* By being exposed to the light and heat in a room, during the time they would be exposed to neither in a natural situation: added to which, the roots of all plants *thrive* only when growing in the dark, which those of hyacinths, &c. cannot do, if put in glasses, especially of white glass; besides the plant cannot obtain, from water only, all the various substances it requires for nutriment.—You had better let me get up the bulbs of these hare-bells, for they lie deep in the earth, and require care and patience to get at.

*M.* There, now I think we have got enough; a few wood-anemonies, and we will be content.

*H.* You must be still more careful in taking up these, for though their roots do not lie deep, like the bulbs of the hyacinth, they are very delicate, and the stem is brittle.

*M.* The flower looks like a rose in form.

*H.* It may do so to common observers, but such a botanist as you should not have said so. Do you not see that the stamens are inserted under the pistils; and that these are *superior*, or not connected with the calyx?

*M.* I do not see any calyx, unless these outer petals are considered as such; or does the calyx fall off early, as in the poppy?

*H.* No; those outer coloured leaves are the calyx: it is a character of the genus to have the two series of floral envelopes undistinguishable.

*M.* Then, on consideration, these three leaves under the flower are not properly leaves, for they are in a verticil, and do not grow like regular leaves.

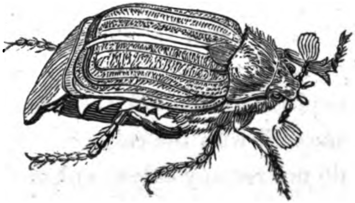
*H.* They are the Bracteæ, or floral-leaves.

*M.* Oh look! what a curious beetle I have found on the ground; what is it?

*H.* I do not know, let us take it home; it seems to me as if it either was ill, or not perfectly formed: here, put it in this pill-box.

*M.* Now I see why you brought those with you; to put insects in.

*H.* Yes; I expected we might find some: now I think it is time for us to go home; next month we will come such another ramble.



THE roots they had collected were planted as soon as possible: a hole being made for each with the trowel, the root was put in, and the earth, broken fine, was scattered gently over the fibres till the hole was filled up again, care being taken that the line of separation between the real root and the stem should be on a level with the surface of the ground, and that no earth or dirt should get in among the leaves. Then the leaves being gathered up in one hand, the mould must be pressed down hard all round the stem, the surface being again raked smooth.

It is advisable to put an empty flower-pot or basket over all newly transplanted plants, that will admit of it, for a few days, removing it only when the sun is warm, but not shining on the plant. Water should be given abundantly to herbaceous plants when transplanted, especially if leafy; this should be poured all round the stem, and the covering put on again.

Sometimes a quantity of water is poured into the hole dug for a new plant, and the earth stirred up with it, so as to form a pudding, into which the root of the plant is set, gently raising this up and down several times, to allow of the fluid mud penetrating among the fibres. This causes the earth to settle close round the root; but it should not be done when the soil is stiff or clayey; and many gardeners think it always objectionable, from rendering the earth round the roots too compact, and like mortar, when dry again.

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THE time had now arrived for planting and sowing the perennial and annual border-flowers. The first fine day in March, that they could get a whole afternoon for the purpose, Henry and Mary went to their garden, with their tools in the wheel-barrow, a large basket containing a variety of seeds of annuals, &c., their marking-sticks, and the plan and list of flowers.

*Mary*. Our wild roots, generally speaking, have succeeded very well, the primroses especially.

*Henry*. They are very hardy, and increase rapidly: there are many other wild-flowers which we shall have to get, for we must procure variety, in our garden, by our own trouble, and not by money.

*M*. Violets, stone-crop for our rock-work, and toad-flax, I recollect.

*H*. Yes, and the pretty Saxifrage, that grows in moist meadows, with a beautiful white flower.

*M*. I know which you mean; it has a curious root, with knobs on it. Are there many of that genus wild in England, for they are favourite flowers of mine.

*H*. There are fourteen of the *genus Saxifraga*, but the *order* Saxifrageæ also includes several others; the marsh Parnassia, with its single leaf and curious fringed processes within the petals, found in boggy places and marshes; and the Adoxa Moschatellina, which I hope to get for our garden, from the woods, which smells of musk, both belong to the order. The pretty purple-flowered Saxifrage, which you so often see in pots, looking something like a sedum in its general appearance, is a native of the mountains and rocky places, in the north: but now to work.

They stretched three lines along the beds, parallel to the grass edging, at the distances of eight inches, two feet, and three feet and a half, from its inner edge; along these they stuck in their marking-sticks, to space out the borders; they did not, however, place the sticks at equal distances, but, paying attention to the size the plant or plants would attain, they left larger, or smaller, intervals between them accordingly, taking care only that the average distances between those of the front row were fourteen or fifteen inches, between those of the second row about two feet, and between the third, or middle row of the east and west beds, about three and a half feet.

Henry having only marked on his plan the places of the taller shrubs, they had to consider the arrangement of the plants which were to come before them, to avoid two of the same hue coming together, and to disperse them with reference to their season of flowering. They effected this in the following manner: before every front shrub in the north and south borders, they put in a marker with the name of a plant from the list of tall standard herbaceous plants, the colour of the blossom of which should contrast with that of the shrub behind it, if they flowered at the same period; but if not, the colour of the standard herbaceous plant was decided on from its neighbours in the same row, so that they might come as nearly as possible in such order as this:—1. Red flower, in July or August: 2. Blue flower, in May or June: 3. Yellow or white flower, in July or August: 4. Red flower, in July or August: 5. Yellow flower, in July or August: 6. Blue flower, in July or August: 7. Red flower, in May or June: 8. White or variegated flower, in September and October: 9. Blue flower, in June or July: 10. Yellow flower, in April or May: 11. Red flower, in August or September: 12. Blue, in August or September: 13. White flower, in August or September.

Then, in the row before this, they alternated the order, putting the flowers between two behind it as much as possible, consistently with spacing them tolerably equally, taking the plants from the list of those from one to two feet high, and so that the colours should contrast with those behind, varying in the time of flowering, and in their situation so as not to come together. And by carrying on the same principle for the front row of the borders, with plants selected from the appropriate division of the catalogue, they effectually guarded against any unpleasant monotony or irregularity of arrangement. It was, of course, impossible to prevent these front flowers from coming immediately before many of those behind them, on account of their being so much closer together: but this was of no consequence, since their dwarf stature precluded them from concealing their loftier brethren behind them.

The following figure will show how plants may be selected from the catalogue, to effect this arrangement nearly. It was drawn out by Henry for his sister, to give to her friends; and through the kindness of one of these, we are able to present it to our readers, who can alter the order, either to suit beds of different forms, or to admit of greater variety, if they possess the means.

**Scheme** for the **Arrangement** of **Flowers**, selected from the List at the end of the work; showing how variety in Colours and in time of flowering may be secured throughout the Borders. The letters indicate the Colour.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| R. | B. | W. | Pur. | Y. | B. | R. | Va. | B. | Y. | Pk. | B. |
| 51 | 58 | 65 | 48 | 54 | 62 | 49 | 66 | 69 | 53 | 52 | 61 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81 | 101 | 92 | 77 | 88 | 102 | 70 | 105 | 85 | 95 | 106 | 79 | 72 | 83 | 74 | 68 | 80 | 104 | 103 | 73 |
| Y. | W. | Pu. | Pk. | Y. | W. | R. | W. | Y. | B. | W. | Y. | R. | Y. | Pk. | R. | Y. | W. | W. | Pk. |

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 126 | 110 | 115 | 141 | 124 | 137 | 114 | 122 | 131 | 139 | 126 | 137 | 110 | 141 | 123 | 129 | 114 | 126 | 125 | 139 | 110 | 130 | 137 | 118 | 136 | 116 | 133 | 115 | 137 |
| B. | R. | Sc. | G. | Y. | G. | Pk. | Y. | B. | W. | Y. | W. | R. | G. | Y. | Pu. | Pk. | B. | Y. | Va. | Va. | Pu. | W. | Y. | G. | R. | Pu. | Sc. | W. |

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It will be observed, that where two flowers of the same colour come adjacent to each other, one blows at a different season to the other.

This was a long, and rather troublesome, operation, requiring care, and especially thought; for not only had they to consider the future size and growth of the plant, but to endeavour to arrange their markers, so that the plants of the back rows should be between those of the front ones; and where this was not practicable, from the difference between the average widths apart, they had to alter the places, so as to produce uniformity in this respect, as much as was consistent with keeping the proper distances.

Mary found amusement, however, in this trouble; she was now sufficiently convinced of the necessity for scrupulous nicety and care in all the operations of gardening; and her brother's remarks and reflections, during the process, were instructive and useful.

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*Henry.* Now, Mary, you see, by putting these markers, with the writing inwards, we shall know where we have sowed seed and where not; for whenever we do sow, we will turn the stick round, so as to bring the writing in front, and that will tell us that there is something sowed.

*Mary.* I begin to fear that the sticks must serve instead of the flowers in a great many places, especially for the first season, for we can never get so many plants as we shall want.

*H.* Certainly not for a long time; but we will plant common annuals in those spots where there is no chance of our getting the plant we want at present, or where, it being a biennial, the spot will be unoccupied during the time we are rearing the seedlings. Besides, we have several other resources against the nakedness of our garden; those vacancies, which are left in the warmest and most sheltered spots, will be usefully employed in rearing the tenderer perennials.

*M.* Yes, and besides, at the worst, we can plant more wild flowers, for there are plenty that are well deserving a place in a garden; and we can learn a good deal of botany, by selecting those which are of the same order as the cultivated plant we want.

*H.* True; for example, if we should not be able to procure roots of the Dragon's-head (134,) we may substitute the great Hen-bit, or common Scull-cap of our fields.

*M.* What are the proper names of those two plants? for I do not know them by those common ones.

*H.* I only used them in compliance with common custom. I mean the *Lamium amplexicaule*, and the *Scutellaria.*

*M.* Well, then, again, we may plant Snapdragons instead of the yellow Mimulus—

*H.* Pray, miss, what is the proper name of that plant? for I do not know it by that exceedingly vulgar appellation.

*M.* Indeed, sir!—but seriously, I could recollect twenty wild plants, which we should really be glad to have, not only as substitutes for others we may not get, but for their own sakes: why are they not cultivated more?

*H.* They are, in large gardens; and when a wild plant has been so for forty or fifty years, it improves in size and colour, and becomes a proper garden flower. The French willow, Epilobium angustifolium, for instance, is a wild shrub of this country; and I need not instance Monks'-hood, Columbine, Fox-glove, Ranunculus, Anemone, and plenty more.

*M.* I think the common Arum is well worth introducing into a garden; it will grow in any shady corners, under other plants, and its rich red fruit is highly ornamental in Autumn. Could not we also get some of your favourite orchises?

*H.* I fear not; they are mysterious plants. Though they produce abundance of seed I am not sure that they have ever been raised from it; they do not bear transplanting either well; but we will try.

*M.* We shall want some tall branching poles, for the centre of our circular border, for the climbing annuals.

*H.* The gardener has promised to bring me some osiers, and willow rods, and other straight boughs, on purpose. I dare say they are come; if they are, we will begin sowing that central spot, and we can then put in the perennials which come in front.

The props were found to be ready, and Henry stuck them in, in a small circle of three feet in diameter, securing them firmly by nailing cross-pieces, as he did with his rustic verandah; only, in the present case, he left all the branching twigs and boughs on, to afford as many supports as possible to the climbers: he then raked and smoothed the ground again, and, forming a drill round the props, he sowed in it, according to his plan, Indian cress or tall Nasturtium (Tropæolum majus,) Everlasting peas, and Convolvulus major, in equidistant patches round it, putting in about six or seven good sound seeds of each. The intervals between, he meant to fill up, in the proper season, with cuttings, or young plants, of the Periploca græca, the Maurandia barclaiana, Ipomœa coccinea, &c., if he should be able to procure them.

On the same, and following days, when the weather permitted, the brother and sister sowed seeds of the hardiest annuals and biennials, at the respective places they had marked for them; such as sweet peas (109), Virginian stock (112), Venus' looking-glass (132), Lupins (78), Adonis (72), snap-dragon, convolvulus (139), hawkweed, dwarf larkspurs (106), lavatera (52), nasturtiums (34), mignonette (141), Venus' navelwort (140), Indian pink (116).

They also planted such bulbs, roots, cuttings, and young plants, as they could procure through the kindness of their parents or friends: their aunt, who had given them the tools, of whom they were great favourites, and who had both the means and inclination of being rationally indulgent, sent them, in aid of their garden, some roots of the superb Martagon (39), in pots, which, as the bulbs do not bear transplanting well while growing, the young folks sunk into the ground, in their proper places. Some clumps of common crocuses (117) they ventured to take up, with permission, from different gardens; and by removing them with a large ball of earth, and with care, they succeeded in transplanting them into their borders without injury, but all other bulbiferous roots they were obliged to forego till the proper season should come for planting them, at which time their aunt promised to send a good supply.

The brother and sister, pleased with the success of their former excursion, undertook another in April, to search for wild plants for their garden, and for botanical study. Equipped as before, they sallied forth one fine morning, determined to brave an occasional shower, and guarded against cold by extra clothes.

*Henry*. Do not let us forget to hunt for another beetle: papa wishes to ascertain certainly whether that we brought home last time was the common cockchafer (Scarabæus melolontha). He says the grubs, or *larvæ*, are buried in the ground, and lie for four years; and will, when numerous, commit such havoc with the roots of grass, that the turf will sometimes peel up as if cut with a paring-shovel. They become perfect beetles in February, but of a white colour, and soft like that we found, and he believes that to have been one. They come forth in May.

*Mary*. Then, I suppose, we can find plenty by turning up the turf any where.

*H*. Why no; for, strange to say, they bury themselves six or seven feet below the surface before they undergo their final change; but if they generally come out of the ground in May, probably we shall find some.

*M.* It is the cockchafer that is so common in August, and flies against your face in the warm evenings.

*H.* Yes; it is called the blind beetle from that circumstance.

*M.* The *larva* is the name given to the insect when it first comes out of the egg; *nympha*, *pupa*, and *chrysalis* are the names after it has undergone its first transformation.

*H.* Yes, with this distinction generally, that the first word is used when the insect in its second state has legs, walks about, and feeds; the second, when it appears motionless, without limbs, and does not move. The pupæ of butterflies and moths are called chrysalises, from a Greek word for golden, because some are of that colour.

*M.* We are familiar with the chrysalis of the silk-worm. What is the distinction between moths and butterflies?

*H.* They differ, I believe, in several respects; but the most obvious characters are, that the wings of the butterflies are erect during repose, and they fly by day; the moths carry their wings, when at rest, either spread out flat, or wrapped round their bodies, and they fly only in the twilight, or at night. Did you ever see the death's-head moth, as it is called, which is the handsomest and largest of our English species?

*M.* No; why is it so called?

*H.* Because there is a figure on its back or thorax, which may be fancied to resemble a scull. It appears in May, and its wings often measure four inches across.

*M.* Whenever one lies down in the grass and looks among the leaves, the variety of insects that may be observed, even in that small space, would lead us to suppose that the number of insects was endless; do you know how many there are?

*H.* I met lately with a table, which seemed to me so curious, that I copied it into my pocket-book, and I have it now with me, and can answer your question.

There are at present known and described,

| | |
|---|---|
| 1200 | species of Mammalia, |
| 5000 | ......... Birds, |
| 600 | ......... Reptiles, |
| 6000 | ......... Fishes, |

8000 species of Mollusca,
100,000 ......... Insects,
4000 ......... Radiated, and other animals,
100,000 ......... Plants.

*M*. That is curious. Do you suppose the great difference in these numbers is occasioned solely by the real difference in the numbers of the respective genera and orders; or does it arise from the different habits of the animals not having afforded so many opportunities for examining them?

*H*. That is a question I cannot answer, but I should think by both causes combined; for example, quadrupeds are comparatively large, and easily seen, therefore the greater number of them must be known; though the ferocity, rarity, or localities of some may prevent their having been accurately examined or described. But of the mollusca, radiata, and fish, it cannot be probable that we know one-third of the number of species that really exist.

*M*. What an overwhelming idea it gives of the extent of life, when we reflect that there are most likely more than twelve or thirteen hundred thousand *species* alone of organized beings!

*H.* If you will remind me when we get home, I will read to you a passage from a book which your remarking the quantity of insects we see in the grass brought to my recollection.

*M.* What numbers more of flowers there are now, to what there were when we were here last; and how different the trees and hedges look, so green and gay.

*H.* Here are some Arums, let us try and take up a few for our garden; but the stems are so large and thick, I fear we shall not be able to dig them up without serious injury to the roots. There, put that in your basket: it is a handsome leaf, is it not?

*M.* Yes; is this blotch on the leaf accidental?

*H.* No, it is the specific character, this being thence called Arum maculatum. You know, the common wild Persicaria has its leaves similarly marked.

*M.* And so has the wild lucerne.

*H.* Which is also called *maculata* for that reason (Medicago maculata.) But to return to the Arum; except some palm-trees, the order Aroideæ is the only one having that singular form of bractea called a spathe, highly coloured.

*M.* What other orders have spathes?

*H.* There is the bull-rush tribe, the screw-pine, or pandaneæ; and perhaps others I forget. But you know of course the membranous spathe of the narcissus, daffodil, &c.

*M.* Ay, and the evening primrose has a calyx resembling a spathe.

*H.* I have heard Mr. Wentworth say that there is a plant of the Arum tribe, called Caladium seguinum, in South America, which, if bit incautiously, causes the tongue to swell so as to destroy the speech, and produces dreadful pain; it is hence named the dumb rush.

*M.* Is this common Arum at all poisonous?

*H.* It is acrid like all the tribe, but the stem is soaked in water in the Isle of Portland, and a powder obtained from it, called Portland sago. There, those four will be quite enough if they do but grow.

*M.* Let us now go into the wood: I like woods, there are always so many things to see in them.

*H.* With all my heart; I agree in your taste, but there are not so many plants to be found in woods as out of them.

*M.* Well then, we will keep on the margin, and so reconcile both objects.

*H.* Be sure you do not gather any new plant before I have seen it first. It is always best to see plants growing, that you may be acquainted with their characters.

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*M.* HERE, then, is quite a new plant to me; and very handsome it is; what is it?

*H.* I do not know; it is beautiful; let me look at it nearer; it must belong to the ranunculus tribe.

*M.* Why so? how do you know? Pray show me.

*H.* Because it is polypetalous, and the stamens are inserted under the ovaria; these are numerous, the leaves are divided, and altogether its looks are those of one of that tribe. But I am not sure, mind.

*M.* Will you dig it up?

*H.* No, I will only gather it; you and I have never seen it before, it cannot therefore be common, and it is a shame to destroy rare species by digging them up, merely for curiosity or wantonness.

*M.* I was thinking of our garden.

*H.* We shall have enough without it; and as we know nothing about its habits, we might not succeed in transplanting it.

*M.* But can you find out what it is without having the root?

*H.* I can find out its order and genus without, for roots do not form generic characters, except in some cases, they are so liable to variation from soil.

*M.* I am glad I found it. Suppose it should be quite a new plant, unknown to all the great botanists! how fine that would be.

*H.* You must not expect to become famous by the discovery of a new species of plant in a country so well explored as England; it is not once in twenty years that a new species of flowering plants is found, though there may be hundreds of unknown cryptogamic.

*M.* Shall we find the Lamium —— I forget the name. I mean the one we want, in the wood or in the fields.

*H.* It grows in corn fields; we will come round by the village, and so pass through some to look for it. What a pretty bank this is, the wood crowning it, and its side covered with plants and so pleasingly broken up into picturesque forms. You sit down for a minute here, and I will climb up it, I have a fancy I may find something curious in that hollow-chalk place.

MARY sat patiently while her brother went exploring; he staid some time in the hole, and then mounting to the top of the bank, entered the wood and disappeared. She amused herself by listening to the various birds, and trying to distinguish one from another; she hunted for insects, examined the grasses and small plants around her, in doing which she was startled by the appearance of a short black snake, gliding among the turf and weeds at the foot of the bank. She was too well instructed to be frightened at any living creature, but she was prudent enough not to meddle with it, suspecting it to be, what indeed it was, a viper. She watched it into a hole, and then put a large stone over this, in the hopes of shutting it in till her brother returned.

Henry rejoined her not long after; and when he heard her account of the viper, he expressed his regret at not having seen it, as it would have been as new to him as to Mary.

*M.* They are not common, are they?

*H.* Not so common, fortunately, as the harmless snakes you admire so much, but they are frequently met with; their bite causes great pain and swelling in the part injured, but is never fatal unless the person is of a bad state of health, or the wound is very improperly treated.

*M.* Snakes are of the class reptiles of course?

*H.* Yes; they constitute the fourth order.

*M.* I hardly know what are considered reptiles; we commonly think of them as something creeping; the word means that, does it not?

*H.* It does. The first order comprises turtles and tortoises; animals having a hard horny case in two pieces, one covering the back, the other the breast and stomach. This order is named Chelonia, from the Greek word for a tortoise. The second order, named Sauria, contains crocodiles, alligators, lizards, and all those animals having four legs, a tail, and a scaly coat. The third order, the Batrachia, embrace frogs, toads, and so on; distinguished from all preceding classes by passing through an intermediate state before assuming their perfect form; as you well know, for you have seen tadpoles, which are the larvæ of frogs.

*M.* Yes, and have seen them in all the stages, from the first most simple with head and tail, to when they have four legs and the tail still left.

*H.* The last order of reptiles are your snakes. But see here what I have got by my excursion; here is an orchis for you, which it is I do not know: but I believe the only early orchis is the Orchis mascula, and so I suppose it to be that. I broke it off trying to get up the root, which seemed deep in the ground. It is a singular plant, is it not? Look what a curious spur the flowers have. I looked about a long while, but could only find this one.

*M.* It is very beautiful and curious; I hope it will live for some time in water. Did you find any thing else?

*H.* A great many plants, which I mean to take home to try to find out what they are; but some are not in blossom yet, and I have brought eight or nine twigs from different trees, that we may study the buds: for while in the wood I was much struck with the very different character of the buds, and of their manner of opening. You have heard papa tell us that every order of plants has the leaves arranged in a similar manner in the bud, and that this is a character employed by botanists to distinguish plants by.

*M*. He called it the estivation, I think.

*H*. No; the estivation is the arrangement of the petals and sepals in the flower-bud, which, though the flower consists of leaves changed in texture and form, differs, I believe, commonly from the arrangement of the real leaves in the leaf-bud: this latter is called the vernation.

*M*. I have often admired how wonderfully the petals of the common poppy are crumpled up in the bud; and yet when the flower expands they are as smooth and perfect as possible.

*H*. Ay, and it would be impossible for us to fold them up again so as to lie so compactly. The estivation of the poppy is a striking example; the two sepals of the calyx merely meet at their edges, while the corolla is crumpled up as you remarked. I suppose also you have noticed the spiral estivation of the common convolvulus.

*M.* I should think gardeners ought to be well acquainted with buds, for they must often observe them anxiously.

*H.* And it is important to them to be so; for in pruning, grafting, budding, and all the nicer operations of horticulture, that acquaintance is essential.

*M.* I wish you would explain to me a little about those operations.

*H.* I will tell you all I know, but that is but little.

THE object of *pruning*, is either to strengthen the plant by removing straggling and long shoots, for the sap which would nourish these if left on, goes, when they are removed, to invigorate the rest of the shrub or tree; or it is done to improve a tree, so that it may be of a more beautiful form, as in plantations and parks; but pruning is principally practised on trees and shrubs cultivated for their fruit; and the purpose is to strengthen the productive parts, by removing the branches and shoots which would not bear at all, or by sacrificing some of the produce, to improve the remainder in size and quality, which the increased vigour of the plant, occasioned by the removal of the superfluous branches, will effect. Gardeners therefore must be well acquainted with the mode of growth of every tree or shrub they cultivate, and especially with the way in which the genus bears its flowers, or its *inflorescence*, as you know it is called.

Some plants continue to produce fruit on new shoots from the same branches for many years, as the apple and pear; here pruning is performed only to prevent the tree from being weakened by too many new shoots, to keep it of a good form for bearing its fruit well, and for letting light and air get to it; but otherwise to leave as much *wood*, as it is called, or bearing branches, as the tree is capable of furnishing with sufficient sap to produce good fruit on. In the peach and apricot the blossoms are only borne on the shoot of the preceding year. In this case, therefore, pruning is only practised to train the newly forming shoots, and to remove the supernumerary ones.

But in all pruning the laws of vegetation must be considered. If many blossom-buds are removed, those that are left will be stronger, from the increase of nourishment they get; if a leaf-bud be removed, it is to prevent a shoot forming which would injure or disfigure the tree, for all leaf-buds form branches in time.

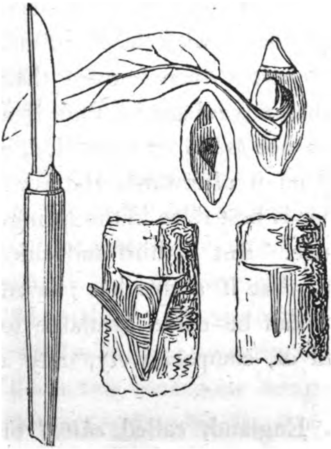
You remember, in my notes on transplanting, I told you that pruning, or lopping, is performed in order to adjust the quantity of leaves to the quantity of sap the root is capable of furnishing. Sometimes, if a plant be very sickly, it is saved by cutting it down almost to the ground; but it is obvious that if by so doing all the knots or *nodi* were removed, no bud could be produced, and the tree could never recover; but as buds will be formed, if the roots are healthy and uninjured, as long as any part of the *stem* is left, there is hardly any limit to the degree in which a tree may be pruned. You have seen large vigorous shoots, or suckers, springing from the stumps of timber trees of certain species that have been felled.

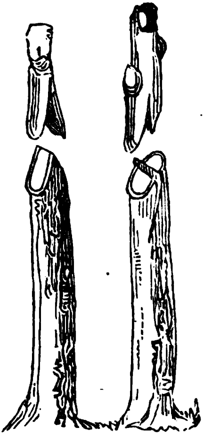
GRAFTING is a beautiful application of the principles of vegetable growth, to the increase or improvement of valuable trees, or to producing a harvest of fruit sooner than it could be obtained from a tree raised from seed. A time proportionate to the average duration or life of the plant, passes, before a tree begins to bear flowers; five or six years, for instance, in most fruit-trees raised from cuttings, and more if raised from seed. The reason of this is, that the plant must first attain that size and strength which can alone enable it to bear the exhaustion consequent on ripening its fruit. Now, if small cuttings, with one or more buds, from fruit-trees, in full bearing, could be made to grow on the stem of another tree, of a sufficient age, a year or two only would pass, instead of eight or ten, before the cutting would send out branches bearing flowers and fruit, for the tree would be able to furnish sufficient sap to admit of this.

But, by a general natural law, no cutting of such a kind would grow on a ready-formed tree, of a genus differing from that to which the cutting belonged, and still less on a tree of a different order. Hence the *stock*, as it is called, or the ready-formed tree, must be of the same genus, and would be still better if of the same species.

The next essential law of grafting is, that the *liber*, or inner bark of the *scion*, as the cutting is called, must be brought into close and accurate junction with that of the stock; for unless this be the case, the sap, which is prepared in the leaves of the scion, could not pass down into the stem of the stock, in order to form new wood, and to keep it in health and alive; and if this were not done, neither, on the other hand, could the stock furnish sap to the new shoots of the scion. This is the practical difficulty of grafting; and I will briefly explain to you the general process, as practised in England, for there are many modes of performing the operation.

The top of the stock is cut off obliquely, and the base of the scion is sloped off at an equal angle to fit on it; this, as well as all similar operations, should be performed with a clean and sharp knife, in order to injure the bark as little as possible: a slit or notch is cut downwards, across the sloped top of the stock, and a corresponding slit in the scion upwards, so that one tongue, thus formed in this last, may be put into the notch in the stock,—the two barks being brought to join as far and as closely as possible. It is, therefore, desirable that the stock and scion should be nearly of equal thickness, that the barks of the two may coincide far round the circumference. A bandage of bass, soaked in water to make it supple, is next tied neatly round the joining, and a mass of tempered clay, or of a composition of resin and wax, or pitch and tallow, is plastered over the bass, in order effectually to exclude air and sun. This is called *whip-grafting.*





The top of the stock, in another mode, called *saddle-grafting*, is cut off in two sloping faces, forming a sharp wedge, and the scion is notched in a wedge shape to fit on it; the rest of the process being the same. Sometimes, if the stock be thick, two, or even more, scions are put on it.

BUDDING is an analagous operation, consisting in the insertion of a single bud only under the bark of a stock, instead of a scion with three or four. Some plants succeed better when budded than when grafted: another advantage is, that if a graft on a stock has not *taken* or succeeded, a bud may be inserted on it afterwards, the same summer, as the former is best done in the spring, and the latter in June. But a third and chief merit in budding is, that if a tree has proved very fine, every bud can be made available to propagate it, instead of, comparatively, only a few scions.

The practice, in England, called *shield* or *T* budding, is thus performed:—Two cuts, at right angles, so as to form a letter T, are made on the smoothest part of the bark of the stock; a bud is then cut off the plant to be propagated, with a sharp knife passed deep enough into the stem to bring away a piece of bark entirely surrounding the bud, and a portion of the wood. This woody bit must be slipped out with the point of the knife dexterously, so as not to injure the root of the bud, or the eye of the *gem* as it is called, for otherwise the bud would be rendered useless, and another must be cut. The bark, on each side of the upright slit of the T, must be separated from the wood of the stock, by means of the ivory handle of the budding-knife, which is made thin and sharp at the end for this purpose. The *shield* of bark of the bud is then inserted under that of the stock; the tip of the former being cut off horizontally, so that the upper edge of it may be brought exactly to join the upper lip of the horizontal cut of the T; by so doing, the bark of the gem will also lie close upon the alburnum of the stock. These two conditions being essential to success, the part is then bandaged with bass, taking care to leave the bud only exposed, and to exclude wet, air, and sun.

You will easily perceive, in both these operations, that the flow of the sap of the stock is kept up, uninterrupted, into the scion or bud, and that this sap is prepared in the leaves of these last, and passes down into the bark of the stock again to preserve the life of the compound plant: to ensure this, the two barks must fit so accurately, that they may join immediately, and grow together by means of the descending juices in the bark of the stock. For whenever a wound is made in the bark and wood of a plant, matter exudes, which granulates or hardens, and, by its vital power, forms new bark to cover over and repair the injury, as the flesh does in animals. I told you before, that when an injured part of a stem is buried in the earth, roots are formed from this exuding matter.

*Mary*. How long does it take to unite the two barks of the stock and scion or bud perfectly?

*Henry*. I believe, three weeks or a month; but in a fortnight the bud or scion will show, by its healthy appearance, whether the operation has been successful, and if the union is going on.

*M*. Do you not think that you and I might try to graft and to bud for experiment sake?

*H*. I know that we will try with plants which we cannot hurt, or are of no value, for we can but fail, and the stock will not be injured: for example—

*M.* By the bye, I was going to ask you how stocks are procured, for, in grafting at least, the head of the tree must be cut off, and that would be waste if it were a fruit-bearing one.

*H.* I told you that it was sufficient if the scion and stock were of the same *species*. Now the finest Downton or Ribstone pippin is only a *variety*, produced by long culture, on the common wild crab, the Pyrus malus.

For fruit-trees, either suckers are transplanted and cultivated into stocks, or seedlings are raised, from the wild crab, or any cultivated apple, which may be chosen for propagating choice varieties on. Stocks for rose-trees, are commonly shoots taken from the wild dog-rose.

*Mary.* Then we can do least mischief by grafting and budding wild roses.

*Henry.* And that is just what we will do; but you must not be very sanguine, for great dexterity, which practice will alone give, is necessary for so delicate an operation. Now let us get up and return home, for we have been out a long while.

*M.* This will be a favourite bank of mine, it is so pretty; and that cavern in the chalk is curious; by the bye, why did you remain so long there when you first climbed up?

*H.* Oh, I forgot to tell you; I first tried to dig a shell out of the chalk, and afterwards I was watching some wild bees; I suppose they were making a nest.

*M.* What shell; how did it come there?

*H.* It was a fossil shell; chalk is often full of them: this seemed a tolerably perfect one, and papa would be glad of it for his collection.

*M.* Did you get it?

*H.* No; I unfortunately broke my old knife in trying, but I will come again with another, stronger, for there it will stay safe enough; no one ever goes into that *cavern*, as you grandly name it.

*M.* How do you know that?

*H.* In many ways; first, there was no mark of footsteps, and no sign of the bushes being torn by people scrambling up; and next, I think the bees would not choose a place for their nest where they were likely to be interrupted; and lastly, any one would have been struck with the appearance of the shell, and would have tried to have got it out.

*M*. Now to go round by the fields, to look for our Lamium and cockchafer, and so home.

*H*. Come, then.

In the course of the month of April, seed of the following annuals was sown; Clarkea pulchella, Escholtzia californica, white Petunia, Œnothera rosea alba, and Lindleyana, Mignonette, Nigella, Marvel of Peru, Argemone grandiflora, Adonis, Zinnia, Scabious, Larkspurs, and new patches of the other hardier annuals, sowed in last month, for a succession of blossoms.

In their nursery-beds, as they called them, they sowed, in regular drills, seed of those biennials and perennials of which they could not procure roots, or which they preferred raising themselves in this manner for next year. Such as the althea frutex, and rosea, vernonia, digitalis, campanula, echium, lychnis, chelone, and many others, selecting the warmest spots and the best soil for the more delicate. They also obtained from different sources cuttings of many plants, which they put, with the gardener's instructions, in pots, and covered them with such hand-glasses as could be spared; watching them, and giving plenty of air in the milder and drier weather.

The month of May brought its labours along with its pleasures in the garden. The young gardeners continued sowing annuals, either the same as already sown, in order to secure a constant succession during summer, or seed of new species, when they could procure it. Weeds now sprung up, and required constant care and labour to exterminate; their nursery-plants were to be hoed and watched; and their annuals required thinning out as they came up, to prevent their being crowded.

They sought information, on *practical* gardening, from the gardener, or from any one who could impart it: the *principles* they could learn from books, and did so learn; but nothing but verbal instruction, example, and experiment, can teach a beginner, even how to rake a flower-border properly, much less how to take and strike a slip or a cutting.

The considerate attention with which such well-educated children requested instruction as a favour, instead of demanding it, would alone have procured them ample information: but their intelligent questions, their attention, their activity and quickness engaged the affection and respect of all gardeners, the best informed and most moral of all labouring men; men, too, always pleased with sympathy shown in their pursuits by persons of a higher rank than their own.

The harvest of amusement in reward of their toils was also approaching. The American creeping shrubs were spreading luxuriantly over the walls, giving promise of becoming healthy and fine plants by another year: this year they were obliged to be contented with the verdure; for, excepting the laurustinus, now nearly over, the sweet bay, brooms, and lilacs, they had at present no shrubs in flower.

In the back rows the columbines, monks'-hood, wall-flowers, and stocks, were coming into blossom and the latter were in full bloom; and in front they had the petunia, which was in full bud, owing to the care they had taken with the tender plants, anxious as they were to ensure the success of so lovely a flower; while their saxifrages, auriculas, daisies, Virginian-stock, pulmonaria, thrift, and several other plants were in perfection. The favourable situation of their garden, with respect to sun and shelter, and its virgin soil, causing every thing to be forwarder than in more exposed situations.

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HENRY and Mary were both busy in their garden one fine afternoon, when the following conversation took place, after a silence of half an hour, broken by the former, who repeated the lines of Logan on the cuckoo, on their hearing his cheering and delightful note breaking the silence of evening:—

> Sweet bird! thy bower is ever green,
> Thy sky is ever clear;
> There is no sorrow in thy song,
> No winter in thy year.

*M.* That is beautiful; do you know more of it?

*H.* Not much; but, Mary, do you feel as I do, a sensation of pleasure, exciting on such an evening feelings of gratitude and delight, which, after venting themselves in inward thanksgivings to the Author of all good, prompt one to recite aloud pieces of poetry suggested by the scene?

*M.* To be sure; I feel as if I loved all the world, all our fellow-creatures, down to the little flies and gnats dancing in the air. I suppose that poets write under such inspirations what we can only repeat. Do not you suppose that all poets have been gardeners, or fond of gardens?

*H.* No, I know they have not; a real poet cannot find food for his mind in the limited and formal bounds of a garden, he admires the flowers, but he fancies them in their native places, on the mountain-side or in the sheltered valley, on the borders of a wood, or on the edge of a cliff overhanging the ocean; but I can tell you that if great poets have slighted gardens for wild and solitary nature, great philosophers and divines have always loved gardening. Did you never read Lord Bacon's *Essay on Gardening?* You sit down here under our trellis, and I will go and fetch it.

*M.* Pray do; and bring also the passage you promised to read to me about the insects in the grass.

Henry soon returned with the books, and read aloud first the following passage:—

"When the pleasant vales reek around me, and the meridian sun rests his beams on the surface of the impenetrable obscurity of my forest, a few straggling rays only stealing here and there into its sacred recesses, I lay myself in the rank grass, on the borders of the falling brook, and thus, approached nearer to the earth, I observe thousands of different little grasses; when I hear the murmuring of the little worlds between the stalks, and observe the numberless, inscrutable forms of worms and midges, I feel them as if nearer to my heart; I feel the presence of the Almighty, who created us after his image; the breath of the Universal Parent, who bears and upholds us in eternal wonder and delight."

Mary then read Lord Bacon's *Essay on Gardens*, both the children remarking on the passages that particularly interested them.

*M.* What is germander?

*H.* It is a species of Teucrium, which is evergreen, that he means. There are two or three that are now cultivated.

*M.* What a few flowers were cultivated in those days; for Lord Bacon, in describing, what he means to be, a princely garden, does not mention a plant, except the orange and lemon, and perhaps a few more, that are not to be found in every cottage-garden at present; and he was, I suppose, too well acquainted with what he was writing about, to omit any that were known, through ignorance.

*H.* I can tell you, from Don's *Hortus Cantabrigiensis*, the date of the introduction, into this country, of a few of the more remarkable exotic or foreign plants.

The Canna Indica, or Indian Shot,
The Phillyrea,
Common Jasmin & Lilac,
Gratiola,
Rosemary,
Yellow-flowered Sage,
Clary,
Two species of Speedwell,
Garden Valerian, 2 species,

Several Irises,
Starry Scabious,
Cornelian Cherry, or Dogwood,
Hypecoum,
Stock-leaved Hounds'-tongue,
Two species of Cerinthe, or Honeywort,
Androsace,
The Auricula,
Broad-leaved Bears'-ear,
Ivy-leaved Cyclamen,
Plumbago,
Convolvulus scammonia,
Peach-leaved Campanula,
Canterbury Bell,
White Henbane,
Mandrake, (Atropa mandragora),
Winter Cherry,
Capsicum annuum,
Asclepias nigra,
Yellow Gentian,
Great Masterwort,
Shrubby Hares'-ear,
Syrian Hartwort,
Broad-leaved Athamanta, or Spignel,
Laurustinus,
Cluster-flowered Elder,
Spring Snow-flake,
One species of Narcissus,
Yellow Amaryllis,
Common Tulip,
Grass-leaved Anthericum,
Two species of Hyacinth,
Broad-leaved Yucca,
Three species of Aloe,
Yellow Day Lily,
The Indian Cress,
Fraxinella,
Rue,
Round-leaved Saxifrage,
Evergreen Orpine,
Scarlet Lychnis,
Caper Bush,
Indian Fig,
Syringa,
Seven species of Rose,
Two species of Cistus,
Pæony,
Rocket and Stavesacre Larkspur,
Yellow Aconite & Monks'-hood,
Garden Anemone and Hepatica,

Five species of Clematis,
Winter Aconite,
Lavender,
Phlomis fruticosa,
Moldavian Dragons'-head,
One species of Alyssum,
Honesty,
Hollyhock,
Downy-leaved Lavatera,
Bladder Ketmia,
An Hibiscus,
White Fumitory,
Spanish Broom,
Lupine,
Laburnum,
Bladder Senna,
Scorpion Senna,
French Honeysuckle,
Sunflower,
Centaury,
Marygold,

were all introduced and cultivated in Britain, between the middle and end of the sixteenth century, during Lord Bacon's life time.

*M.* I was quite wrong then, and his lordship did not mention them from other reasons, for there were plenty enough of pretty flowers to stock any garden. How agreeable is his description of his heath, as he calls it, at the end of the garden, and what good taste he generally displays in the arrangement of the whole.

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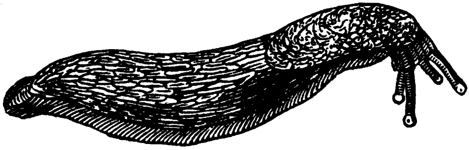
EARLY in the month Henry obtained some Dahlia roots, to plant in the front rows of their shrubbery, as they called the north and south beds; but finding they had not enough to fill up some places that were unprovided, Henry resolved to beg a few cuttings, which he planted in pots, taking care that each cutting had a piece of root. The pots he placed in a hot-bed, in his father's garden, to strike, intending to remove them from thence into the green-house, before planting them out in their destined places, in order gradually to accustom them to the open air. If carefully managed, Dahlias will blow the first year.

The garden wore a gay appearance early in June; the care of the young people was rewarded by abundance of lovely flowers, and Mary repeatedly expressed her contentment with the reward of her toils. She had become as methodical as she was industrious, going round her borders, cutting off withering flowers, tying up those that drooped to sticks, picking off caterpillars and slugs, hoeing round the roots of all plants, and finally gathering up dead leaves, weeding and sweeping her gravel-walks for her brother to roll.

They continued to sow annuals, hardy and half-hardy, as vacancies occurred; they watched the dying of the leaves of the few bulbs they possessed; and as soon as these turned yellow, they dug the bulbs up, and laid them in the sun to ripen, covered over with clean sand, to prevent their being burnt. When the leaves were quite withered, they took them up, cleaned them, and put them away in paper bags, properly written on, in a dry dark closet, till they were wanted to be planted again in October.

Henry told his sister that the bulbous plants which flowered in autumn, such as the colchicum, amaryllis, and some others, are not taken up till early in the following summer; the offsets are taken off and immediately planted in nursery-beds or pots. The parent bulbs are re-planted in about a month or six weeks.

*M*. What is the reason for taking up the bulbs of any species, if planted with sand at the bottom to prevent their rotting from too much wet? why should they not always remain in the earth after they have flowered.



*H*. Most bulbous plants come from countries where the summers are perfectly dry, so that the *buds* (for you must always remember that they are buds) lie dormant during that season, as those of our trees do during winter, and begin to grow again only at the return of mild weather in spring, when showers give new impulse to their vitality. Now in our moist climate, if the bud were left all the summer in the earth, the wet and warmth would cause the flower intended for next season, which is ready formed in the bud, to continue growing, instead of being in a quiescent state: the consequence would be, that it would be killed during our winter, being too tender to bear cold when so far advanced. But by taking them up, the growth of the bud is stopped, as it would be in a state of nature in their own country, and they are thus, with proper care, enabled to brave our winter, and to revive again on the return of spring.

*M*. It was fortunate that you told me not to cut off the leaves of the bulbs in time, for as soon as the flowers were off I should have done it, considering the leaves as blemishes in the border.

*H.* It should never be done, though some ignorant gardeners do do it: the leaves are required to convert the sap into nutriment for the embryo leaves and blossoms for next year.

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DURING the month they sowed Brompton and giant stocks in their nursery-beds, to flower next year: they also experimented on laying some roses, which had been neglected in their father's garden, and some pinks and carnations; following with care the instructions which Henry had written out for this purpose.

The rock-work had succeeded as well as they could expect; the common toad-flax was rapidly spreading over the shady side; the pretty little flowers, with their comical spurs, affording diversion and pleasure whenever examined; the common helianthemum, which abounded in the neighbouring county on chalk, had borne transplanting, and promised a golden harvest of flowers in a few weeks. The common houseleek was the only plant which disappointed them; they had put several *offsets* on different parts of the work, but they gave no hopes of thriving with all their care; while the roof of a blacksmith's shop in an adjoining village was covered with the plant in the highest perfection without attention, and regarded as an intruder. To make amends, however, stone-crop, money-wort, nolana, and the pretty, though common, London pride were doing well.

*Mary.* I am sorry about the houseleek, the tuft of flowers is so handsome. Do you think if we were to sow the seed when it ripens, gathered from the shop roof, it would grow?

*Henry.* Perhaps we put it in too much garden mould; you know where we see it growing always it has nothing but mortar, or but little soil to grow in. But if we do not succeed in propagating it by suckers, we must give it up, for it is one of those plants which do not ripen seed, the stamens bearing commonly abortive seeds instead of anthers.

*M.* What is its botanical name, and the natural order to which it belongs.

*H.* It is the *Sempervivum tectorum*, the generic name alluding to its hardy nature, admitting of its growing in the most barren places, and the specific name means, "of roofers," or tilers, because it commonly grows on roofs. It belongs to the order Crassulaceæ, to which the sedum, comprising the orpine and stone-crops, the navel-wort, and a genus called Tillæa, belong, which are found in Britain. You have often admired the handsome pink Crassula which Miss —— has. They are all fine flowers, and abound at the Cape of Good Hope, growing always in the most barren places, exposed alternately to a scorching sun and cold dews at night.

*M.* From their thick fleshy leaves, they ought to belong to some general order, along with aloes, cactus, and such plants.

*H.* This succulent form of leaf is a wise provision of nature against the aridity of the places the plants grow in, without which they could not thrive in such localities; but it is not a constant or important character; observation shows that many plants, if they could be habituated for a season or two to such situations, would assume the same form of leaf; and, on the contrary, that these succulent-leaved plants would lose, in some measure, this peculiarity, if they were, or could, be raised for several generations in moister soil. Now let us hoe a little round our border perennials and shrubs.

*M.* Afterwards we must give them some water; the earth is quite dry.

*H.* Gardeners differ much about watering plants; some think it necessary to water much, others say it is useless, and often worse.

*M.* What do they mean? No plant can live without water!

*H.* Of course not; but they mean that the earth seldom gets so dry in this country as to render it necessary to water plants so much as most persons do; and it is certain that when the surface of the soil appears quite dry, if you hoe deep you will find it moist below.

*M.* And which system, water or no water, shall we follow?

*H.* Neither too strictly; but I believe the non-waterers are more nearly right than the others. The fact is, that it is less laborious to water than to hoe; and the idle gardeners prefer watering, which revives the drooping plant quickly and easily, when it would really thrive better for a good deep hoeing round it. But in our case we want pretty flowers, and not hardy plants. To flower finely, plants should not be too strong.

*M.* Can any plant flower the better for being weak? I should have thought that as flowering and ripening the seeds must weaken the plant, the strongest only could endure it.

*H*. Such is not the fact however. The great object in nature is to ensure the continuance of the species; those plants which would not live long flower soon, in order that the end of their existence may not be frustrated, while the hardy ones, growing in a favourable soil and situation, spend their vital force in augmenting their bulk, producing new branches and roots, and attaining the full growth of their species before they begin to flower. But remember, by weak plants I do not mean sickly plants. The plant must be perfect, to flower at all; but if it have all its essential constitutional qualities, it then produces flowers early in proportion to its debility.

*M*. Then, according to the non-waterers as you call them, it must be wrong to mix up the earth into a pudding with water, to put the roots of a newly transplanted plant in.

*H*. They make allowance for the circumstances of the case, for, of course, after all, no theory can stand against experience. If the root has been injured, or the plant be an evergreen, or have leaves on it, water may be necessary to it when transplanted, to compensate the great evaporation; and delicate plants, which are easily scorched by the sun in dry weather, must be watered or shaded to protect them. But, I repeat it, a plant well *cultivated*, that is, well hoed and dug round frequently, will survive almost any drought, while abundant watering without such digging will positively injure it.

The month of July was a busy one in the garden. Henry still continued to sow annuals, to preserve a show as late as possible; but their principal occupation was taking and striking cuttings of shrubs, and dividing the roots of herbaceous perennials that had done blowing, in order to multiply their stock.

Mary had still to regret the vacant spaces for which they had not been able to obtain plants; though, from their diligence in sowing annuals and transplanting wild-flowers, the garden wore a gayer and less barren appearance than even she had expected. One good attended this very deficiency, which was, that it induced her to bestow great pains in hoeing, raking, and weeding, in order to keep her borders as neat as possible, and this frequent stirring of the earth was exceedingly beneficial to every thing growing in them. The consequence was, that when they divided the roots, instead of having only one or two new offsets from one root, they had generally two or three of a respectable size.

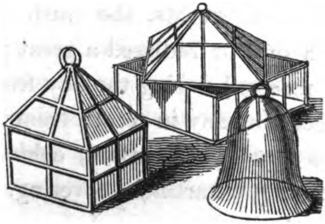
They had also to watch the ripening of the seed-vessels of some plants which they had suffered to run to seed, for the purpose of propagating them in that mode; and as soon as they judged that the *fruit* of the plant, was arrived at maturity, they gathered it and put it away in brown-paper bags, made expressly, writing on each, the name of the plant, time of gathering, &c. The bags were kept in a cold dry closet, to be ready for next spring.

When it was resolved to save seed, Henry always preserved the first flowers which appeared, for this purpose, because, as he told his sister, the first flowers on a plant are generally the finest and strongest. All the other flowers, on such plants, should be cut off immediately they open, which prevents the nutriment from being diverted from the ripening fruit, and thus causes the few flowers left for the purpose to bear finer seed.

They also *laid* a few pinks and carnations (see p. 59), rather for experiment than as a mode of propagating them, for they had no ambition to grow fine flowers, in the florists' sense of the word; and the easier and safer mode of propagating, when this is not the object, is by cuttings, or pipings, &c.

Their *nurseries*, as they called the sloping bank, and the western borders under the palings, were especial favourites; these presented, at all times a singular and pleasing variety. Henry had taken the trouble to divide them out in small compartments; and had diversified the soil by digging in sand in one, lime in another, manure in another, peat and bog-earth, &c., so that they had compartments ready for different plants, according to the soil, shade, aspect, &c. they required, in order to thrive. And as the room was limited, and they were desirous of raising as many plants as possible themselves, to spare their money to purchase those they could not otherwise procure, they husbanded their space with economy, by excessive neatness and order, planting their slips, cuttings, offsets, &c., in perfectly straight lines, with great regularity, and removing those that failed, and filling the space up with others,—putting the pots, filled with cuttings, which would not bear the open ground, in one part by themselves.

They paid great attention to covering up all newly-planted slips, divided roots, &c., to protect them from too rapid evaporation and cold till they struck root; and, as they had not the command of many hand-frames, possessing only three large-sized ones and two small, they had recourse to all other possible contrivances for this purpose; such as cracked or broken tumblers and wine-glasses, for very small slips or pipings, clean garden-pots and baskets; and over some beds in their nurseries they spread mats, raised on short stakes, stuck neatly and regularly in the earth for this purpose.



*Mary.* I observe that you are always more particular in covering over our nursery plants on fine evenings; I should have thought that they would require it most on dark cloudy nights.

*Henry.* If you will lay a thermometer out on the ground at night, and watch it, you will find that it always stands lower, or indicates greater cold, when the sky is clear, than when it is cloudy. For the clouds are masses of water condensing from a state of vapour, and, therefore, give out a good deal of heat to the earth, to compensate for that which is always radiating from the surface. This is the reason why there is more dew on clear than on cloudy nights; for dew is deposited most on objects when they are coldest, as you well know from having observed the *dew* form on a bottle of fresh spring water when the air is moist.

Now on clear nights, the earth and plants have given out, or radiated a great part of the heat they received during the day from the sun, without receiving any in return from the clouds; the plants become, therefore, colder on such nights, and require artificial covering.

*M.* But does not the dew on the leaves of plants refresh them? I am sure grass and all plants in the fields look more vigorous in the morning when the dew-drops are glittering on them.

*H.* They look better in the morning, because vegetation is vigorous during the night, after the action of the sun during the day, and the green parts are not withered by the too rapid evaporation which the heat of the sun causes in the day-time. But dew, or any moisture applied externally to the leaves of plants, does them little or no good I believe. The only advantage in watering the herbaceous parts of plants, is, that it removes the dust which by settling on them, clogs the pores, or impedes the healthy evaporation from the leaves, as dirt on our skin is injurious to our health by checking perspiration.

*M.* Then the plant if kept free from dust would thrive just as well, if all the water given it were poured on the ground round the stem, so as to soak down to the roots.

*H.* Precisely, in some respects, but I should have mentioned also, that watering the whole plant is also beneficial to it by destroying or driving away insects.

*M*. That is very essential, for insects do much harm to all plants.

*H*. There is hardly any plant which has not some insect which lives on it; besides destroying the leaves by feeding on them, the insects pierce the bark, the buds and other parts, in order to deposit their eggs, and the young larvæ when hatched, feed on these tender parts, and thus eventually kill the whole plant.

*M*. How do gardeners prevent this, especially in large gardens.

*H*. It is one of the most troublesome and irksome parts of their business; there are numberless ways which have been proposed for destroying the different species of insects, or for preventing their attacks. Some water the plants with lime-water, others with tar-water, others dust dry lime over them, or lay a circle of quicklime on the earth round the stem. But I believe the best and surest way is, to make yourself acquainted with the natural history of the various insects, as for example, their food, time and manner of laying their eggs, the form, appearance, and habits of the larvæ, and so on, and then to attack them at the proper seasons, by searching the plants individually, and destroying them when about to lay their eggs, or before they are hatched.

*M.* Which are the most injurious insects, or those whose depredations are most to be feared?

*H.* That depends on the part of the plant which is most valuable. Wasps, and earwigs are destructive to the fruit; slugs and caterpillars to the leaves; aphides, red-spider, and so on, to the plant generally, by depositing secretions on it which hinder the healthy action of the leaves. The wire-worm attacks the root, and quickly kills certain species, by penetrating to, and feeding on the pith, or on the medullary sheath.

*M.* This last must be a fatal enemy, since it cannot be seen.

*H.* The injuries caused by it are seen, perhaps, sooner than those of any other vermin; the plant droops without any apparent cause, and active gardeners when they notice this, take it up and exterminate the enemy. I believe lettuces when transplanted are especially subject to its attacks.

*M*. I hope it will not come into our garden.

*H*. I do not think it infests flower-gardens much, or else our's would be exposed to it, for the wire-worm abounds in grass lands.

*M*. When we consider the number and variety of insects and animals which prey on plants, it seems wonderful that there should be any vegetation at all on the earth.

*H*. You will easily perceive by reflection, that at any one period of the history of the earth, the existing species of organised beings must be exactly *balanced*, that is, that none can increase in an undue proportion, unless the food of that particular species could be increased at the same time in a corresponding proportion; if the number of feeders, by any accidental circumstance, were temporarily increased, the overplus must soon die of famine, as happens with locusts in those seasons when they have multiplied so as to desolate whole regions of the earth; after consuming all the plants, they die by millions of hunger. Again you will see, that if any one species did increase at any time beyond its average number, some other species, which feeds on the former will increase, from this abundance of its food, and will therefore speedily reduce the excess of the first; if on the contrary, cold and wet seasons or other natural causes, produced a diminution in the average number of any species, this deficiency must soon reduce by famine the numbers of the particular species which preyed on the former; a balance between the two being again restored; if the natural causes I just mentioned are removed, the first species in time will multiply again, and will thus enable the second to increase its numbers and keep pace with it.

If the natural causes which influence the existence of a species, permanently change, that species must in time become extinct, and as I have shown to you the extinction of any one species must bring about that of another which feeds on it, while on the contrary, those species which were the prey of the first will increase for a season. Permanent changes in the temperature of different portions of the earth's surface, brought about by those slow but constant agencies, which are always acting on it, are perpetually causing the extinction of species, and it seems by the sudden appearance of new species, that new CREATIONS are made from time to time, to fill up the blanks.

Man alone from his reason forms an apparent exception to this general rule, he, for some thousand years has been progressively multiplying over the whole earth, and has exterminated, and is constantly exterminating, other species of organised beings, either by consuming them for food, or destroying such as are hurtful to him: but even man must eventually obey the same general law, and should he multiply beyond the capability of the earth to find him food, further increase in his numbers would be impossible.

*M*. Do philosophers account for the disappearance from the earth, as living species, of those which are found fossil, on these principles?

*H*. Certainly; there are causes always in action, though the effects are too small and too distant in their recurrence for us to notice, which are constantly changing the relative temperature of different portions of the earth. These changes effect corresponding alterations in the whole vegetation of these portions, and animals which depend on vegetation for food, must either migrate from the countries in question to others where their appropriate food is to be found, or if their habits and structure render such migrations impracticable, they must perish and their races become extinct.

*M.* Is there any known instance of a species of animal having become extinct since attention has been paid to the subject of natural history.

*H.* Only one I believe, and that is but imperfectly recorded; I allude to the Dodo, a bird which existed in the Isle of France in the seventeenth century, and which is now found no more. But come, we must now go to work again.

*M.* Our grass-edgings are getting out of order; the grass is too long and wants mowing.

*H.* We must get the gardener to cut them with shears, the edgings are too narrow to be mowed; but we had better first cut out the roots of all the leontodons, daisies, and especially the plantains, which disfigure the turf, and sow fresh Dutch clover seed in the vacancies; by so doing, in time we shall have the edgings quite uniform; we must also cut the two edges to a straight line by the sharp edge of a spade, to prevent the grass from extending over the border and over the gravel walk: when this is done, by putting a little fresh clean gravel, close up to the turf all along, the edgings may be kept neat; but the trouble grass is constantly giving, will make me anxious to get box round the borders as soon as possible.

*M.* It will be several years though before we can hope to do that.

*H.* I fear so, yet we can get one border done at a time, as soon as we have sufficient box.

*M.* Do not the gravel walks require repairing occasionally?

*H.* It is better to break them up once a year, in May, with a pickaxe, and then roll them smooth again, doing it early in the morning, or when the sun is not shining on them; but I trust as our walks were well laid at first, they will not require much till next May. Indeed till the garden is in perfect order, with all shrubs and perennials put in and thriving, it is useless to bestow much trouble on the gravel-walks in keeping them quite smooth, since the heavier operations of gardening must injure them a little.

*M.* How fortunate it was for us that papa gave us this garden at the time he did, for if he had not given it to us till now, for instance, we could not have done much with it till the following spring, could we?

*H.* A garden may be laid out at any time of the year, and the seeds of many biennials and perennials sown, which by being covered up with glasses during the winter, will be ready to be planted out in the borders in the ensuing spring; for annuals of course, spring must be waited for. I believe there is no month of the year in which a great deal may not be found to be done in any garden; even during severe frost, if there be any plants in the ground, watching them, covering them up, and giving them air occasionally in the middle of the day when the sun shines, will occupy a good deal of leisure time, if a person be fond of his garden. And whenever the weather is *open* there is always digging, manuring, weeding, and so on, to be done.

*M.* I suppose our garden will not want any manuring for a long time, which I am glad of, for it must be a nasty operation.

*H.* Flower gardens do not require strong manure, or any which is very offensive; dry withered leaves, old tanner's bark, clean sand, a little lime, and dry cow-dung even, are not very formidable things.

*M.* I wish you would explain to me a little about manures, and what they do for the earth; but first tell me what are the different soils fit for supporting vegetation?

*H.* I will tell you all I know, but it is a difficult subject, and one on which comparatively but little is known at all.

You know that the upper stratum of the earth, in which plants grow, is a mixture of mineral substances of different kinds, with decayed vegetable and animal matter. The minerals are principally the three *earths* as they are chemically called. Flint or *Silex* in the form of gravel and sand. *Lime*, which is always combined with an acid, forming *carbonate* of lime: and clay, which also is never found pure, but combined with a little iron and other matter. Besides these three earths, there is in all soils a small proportion of different *salts*, but forming a most important ingredient in them. The *mould* to which fertile soils owe their dark colour is vegetable and animal matter in different stages of decay.

Plants *will* grow in nearly pure flint, or carbonate of lime, provided they can get air and water, but clay when pure is absolutely barren; hence soils in which this is the principal ingredient are the worst for vegetation. Stiff clay soils are improved by mixing sand or lime with them. If the soil is too light, or too sandy, a portion of clay being added, remedies the defect. Lime is an essential ingredient of all good soils, it is one of the most powerful and valuable of manures.

Mould is found to be a compound of the four simple elements of *oxygen*, *hydrogen*, *carbon*, and *nitrogen*; the first three being the principal constituents of all vegetable matter, and the last abounding in animal. Now you know, from what you have learnt of vegetable physiology, that oxygen and carbon are indispensible to vegetation, and hence the fertility of mould.

Mould is not soluble in water, it remains unchanged when kept from the air for any length of time, but when exposed to the atmosphere it decomposes; some of the carbon unites with the oxygen of the air, and forms *carbonic acid gas*; this is eagerly absorbed by the herbaceous parts of plants for food; while the hydrogen of the mould combines, by the agency of electricity, with another portion of the oxygen of the atmosphere, and forms water. This is the reason why the soil is moist a little beneath the surface, even in dry weather: and in hot climates, where there is little rain or dew, plants derive their principal supply of moisture from this process.

Does not this beautiful economy of nature deserve our wonder and gratitude? Animals and vegetables die, decompose and restore to the earth those *principles* which are essential to the development and growth of new races of vegetables, and through them of animals; a few and simple changes thus going on in an eternal circle. Our corrupt and mortal part serving in turn to restore the fertility we have exhausted, in deriving food for our support during our sojourn on the earth.

When the mould has thus been deprived by the action of the air, of a portion of carbon and hydrogen, the remainder becomes soluble in water, and is thus taken up by the vessels of plants, and furnishes their *sap* with the substances necessary for the formation of the proper juices, as gums, oils, &c. &c. By exposure to the air for a long time the mould again absorbs oxygen and hydrogen, and becomes again insoluble; hence the necessity and importance of frequent turning up the ground, in order to bring fresh portions to the surface to undergo these chemical changes. This is the reason why frequent hoeing and digging accelerates the growth and vigour of plants.

If the soil were all mould, it would be too rich, plants growing in it would be *overfed*, and grow rank, besides, mould would become acid or sour by the mixture of water if suffered to remain in it, and would injure and destroy vegetation. These, and probably other reasons we are ignorant of, render it necessary to *dilute* this over-rich soil, if I may use the expression, with sand, lime, and mineral matters which keep the soil light and pervious to water, especially the first; and also furnish other parts of the nutriment essential to vegetables.

Good *loam*, is a soil composed of the three earths alone in different proportions, and is capable of maintaining any vegetation, if the climate be suitable for temperature and moisture.

The best soils for wheat consist of from forty to seventy parts of clay, from twenty to ten parts of sand, from thirty-six to ten parts of carbonate of lime, and from four to ten parts of mould, in every hundred.

A good garden soil should contain only fourteen parts of clay, forty-five of sand, ten of carbonate of lime, and thirty-one parts of mould in the hundred.

It is usually the first operation in laying out a garden, to manure, and bring the soil as nearly as possible to these proportions. For this purpose it is often necessary to *analyse* the soil chemically, to ascertain the ingredients which compose it, and whether there is any mineral substance in it which is injurious to vegetation, as the earth magnesia is. This analysis is easily and simply performed, but experienced gardeners can always tell by simple inspection what a soil wants to render it more fertile, and they judge especially by what *is*, or is *not* already growing on it.

VEGETATION in time exhausts the soil by taking away the carbon and organic matter from the mould, the mineral, inert matter being, nearly, alone left; but as the various genera of plants require different substances in different proportions for their support, after one species has exhausted the soil by absorbing all the matter which it required from it, another species, if planted, may still find in the ground, the peculiar substances necessary to its growth, which the former crops had rejected. And, again, as the roots of different plants penetrate to different depths, one species may find a fresh supply of the same substance at a lower depth, to which the roots of the previous crop had not reached.

This principle explains the necessity and value of the *rotation of crops*, as it is termed. Formerly the soil was left to lie *fallow*, or entirely unoccupied for a year, in order to recruit it, but it has been found that by a succession of crops, the loss occasioned by letting any part lie fallow is saved, without injuring the fertility. I will explain this by an example or two. That rotation of crops called the *Norfolk*, consists in 1st, planting turnips which are well manured. 2. A crop of barley. 3. Clover; and lastly wheat; the first and third crops affording food for the live stock, which in return furnish manure for the land. Some rotations occupy six or even more years before the first crop returns again; one, for instance, begins with 1. Beans or potatoes, well manured. 2. Wheat or oats. 3. Barley or oats, if not sown the year previous. 4. Peas or tares manured. 5. Wheat. 6. Clover or grass sown among the wheat, and kept as pasture-land for two or three years, when beans come again. But of course much depends on the nature of the soil.

Now the object of *manuring* is to restore those chemical principles to the soil which vegetation has exhausted; and as these are contained in all vegetable and animal matter, when decomposing, the substances which can serve as manures are endless.

Weeds and any growing vegetable matter ploughed into the land, form one of the best manures, but this is obviously too circuitous and expensive a mode of proceeding. Sea-weeds are excellent, as they furnish the soda which plants require.

Many vegetable manures, as *rape and linseed cakes*, the refuse left after the oil has been expressed from the seed, soot, &c. are often applied by being mixed up with the seed when sown.

All refuse animal matter, as skin, bones, horn, hair, woollen rags, bad fish, blubber, blood, dung, and so on, are used as manures. In all manures, the object is that the substance should decompose on, or in, the earth; therefore, it is desirable to prevent a stack of manure, as a dunghill, from fermenting: this is done by keeping it cool and dry.

When a crop ripens its seed, it exhausts the soil proportionably more than one grown for its leaves and roots only; hence grain of all kinds, peas, beans, and so on, require the soil to be manured after them much more than grass, turnips, potatoes, carrots, &c. &c. This is one reason why a flower-garden does not want much manure, for the flowers are usually gathered early. So that you need not be apprehensive of our requiring to contaminate ourselves with the "nasty" substances you expressed such horror of.

*Mary.* These nasturtiums, convolvuluses, and the everlasting-peas which we sowed in the centres of the beds (B., see plan, p. 9), will soon be too tall for our stakes.

*Henry.* In planning the garden, I had it in view, to cause those four beds to unite with the centre circular one, in forming an agreeable outline as seen against the sky or distant trees. The plants decreasing in height gradually to the front will give the whole bed the pyramidal form which is always picturesque, and the central cone will rise in the middle of these four corner groups. But it will be still better next year, when instead of these climbing annuals only, we shall have hollyhocks, superb martagons, mulleins, foxglove, and viper's bugloss; all of them splendid plants.

*M.* Do you remember, the beautiful plants of the last three we saw in the edge of the wood at ——— last year? I did not then know much about flowers, but even I was struck with their height and rich colours.

*H.* While we have such plants wild in our country we may be content, though we have no bignonias, epidendra, and other splendid creepers of tropical countries. The vipers bugloss, which is not commom on the Continent of Europe, strikes foreign botanists with surprise, from its beauty: one said, it was a flower fit for the gardens of the Gods.

*M*. And the foxglove is but little behind it, both contrasting agreeably with the delicate blossoms of the mulleins. Chalk countries for me, for it is on chalk soils that these favourites grow; and you will agree with me for the sake of your orchises.

*H*. I do, and there is also the helianthemum, and many other pretty smaller plants which are only found in counties where chalk or limestone is the substratum.

*M*. Is not that a nightingale singing.——I thought that bird only sang in the evening.

*H*. By no means, they sing also all day long, as other birds; only, in consequence of the multiplicity of sounds, they are not so much attended to. You know our poet says—

> The crow doth sing as sweetly as the lark,
> When neither is attended; and, I think,
> The nightingale, if she should sing by day,
> When every goose is cackling, would be thought
> No better a musician than the wren.

*M.* Well, you see Shakspeare thought, like me, that she sang only in the evening.

*H.* He only *spoke* as a poet, and in truth the nightingale does sing principally at night; but, as you hear, she also sings by day, for that is a nightingale as I think.

*M.* There is no other bird's song which could be mistaken for it.

*H.* Yes, the blackcap's song is but little inferior, and as this bird arrives here about the same time as the nightingale, his notes are sometimes taken for those of the latter bird.

*M.* Is the nightingale a bird of passage.

*H.* Yes, she winters, it is supposed, in Persia and the East, returns here about the beginning of April, and quits us again in August; I can give you a list of the birds of passage of Britain, arranged in the order of their annual returns; I took it from White's *Natural History of Selborne.* Gardeners ought to become acquainted with birds as well as insects.

### *Summer Visitors.*

| | |
|---|---|
| Wryneck .................... | Middle of March. |
| Small Willow Wren......... | End of ditto. |

| | |
|---|---|
| Great Plover | End of March. |
| Nightingale | Beginning of April. |
| House Swallow | Middle of ditto. |
| Martin | —— |
| Sand Martin | —— |
| Blackcap | —— |
| Cuckoo | —— |
| Middle Willow Wren | —— |
| White-throat | —— |
| Redstart | —— |
| Swift | End of April. |
| Lesser Reed Sparrow | —— |
| Corn Crake | —— |
| Largest Willow Wren | —— |
| Fly Catcher | Middle of May. |
| Fern Owl, or Goat Sucker | End of ditto. |

*Winter Visitors.*

| | |
|---|---|
| Redwing | Michaelmas, and depart in February. |
| Fieldfare | |
| Woodcock | |
| Wild Goose | In October, and retires northward in April. |

*M.* I forgot to ask you if you made out what that flower of the Ranunculus tribe was, which I found when we went our excursion together (see p. 89.)

*H.* Yes, with a little help from mamma, I discovered it to be the Helleborus viridis. It is rather a rare plant, and papa was glad to have it to dry for his collection.

*M.* I wonder I never thought about it again; but I remember now, we found on our return home, my aunt's present of plants waiting for us, and that put it out of my head.

*H.* True, and you had to find boxes for the beetles, and flies, and bees, you collected.

*M.* I think, I must content myself for this year with botany, and leave insects till next.

*H.* Yes; give the principal part of your time to botany certainly, but do not neglect to observe insects whenever you can; it will prepare you for studying them better if you should hereafter choose to do so.

*M.* What a pretty flower this common periwinkle is, and how singularly the anthers terminate in downy caps which cover over the stigma.

*H.* Yes, and what a droll little thing the stigma is. The order to which it belongs, is characterised by that ring at the base of the stigma.

*M.* But how is it that the pistil comes away with the corolla; as if it were not united to the stalk at all, how can the fruit ripen if it falls off with a deciduous corolla?

*H.* It is only the style which drops off, there is the double ovarium remaining in the calyx; the style is jointed, or *articulated*, with the stigma in many plants.

*M.* How flowers are wasted on most persons; they smell them, look at them slightly, or only admire them for their size and colour. Yet, if examined minutely as we have done this vinca, how interesting and instructive the examination, even if one is not a botanist.

*H.* And every time the attempt is made, the power of observing and seeing is improved; for *looking* is one thing, and *seeing* is another. Now you, from having noticed the detached style of that flower, will have a clearer idea of the pistil and its divisions into ovarium and style.

*M.* Which are the most instructive flowers to dissect, for the purpose of studying the various organs.

*H.* I think most is learnt from irregular flowers, though all that deviate from the commonest form are instructive for that purpose. There is a flower, the loasa, recently cultivated in gardens, which is regular but complicated: it is polypetalous, the petals in more than one verticil, and the outer row are hooded, or *cucullate*, like the monks-hood and inclose the inner row of the stamens; altogether the flower is puzzling to a learner. If you meet with it in a garden, take care how you touch it, for the leaves are stinging like those of the nettle, and the poison is much more acrid, and causes more severe pain.

*M.* Then the common iris is also instructive; the petaloid stigma covering over the anthers, confuses a beginner, who often takes these for petals. I made a drawing of the pretty Persian iris mamma had in the spring, and I mean to draw the escholtzia beside it, as a specimen of a dicotyledonous plant.

*H.* Show it me when it is done.

ESCHOLTZIA CALIFORNICA.

PERSIAN IRIS.

*M*. Well, now mention some more curious flowers, for I am going soon to a celebrated nurseryman's, and I will look out for the rarer exotics that are interesting.

*H*. Observe especially any orchideæ there may be, such as the Renanthera coccinea; then all the plants of Apocynæ and Asclepiadeæ, such as the gonolobum, apocynum, asclepias and stapelia; in the flowers of the last order, the stamens adhere to the stigma, which is much expanded, and there is no filament nor style.

*M.* I think I have seen the stapelia; is it not a speckled lurid-looking flower, with fringed pointed petals, which smells most abominably?

*H.* There are many species, all with flowers as you describe, and the leaves are thick and succulent like the stem of the cacti. That delicate, cream-coloured, waxy-looking flower, the hoya, also belongs to the order. The important point for examination, by a beginner, is whether a plant is apetalous, or has a calyx only, or whether there is both a calyx and corolla. You know many flowers of rich colours have no corolla; the proteas, for example; the begonia, again, with its delicate pink sepals, is apetalous: the Marvel of Peru, also, has no corolla.

*M.* Is there any rule for distinguishing whether there is a calyx and corolla in those plants which have more than one verticil of floral envelopes. For, when there is only one, I know it is always considered as a calyx.

*H.* No, there is not, it is only decided from analogies with other orders, which have the character too distinct to be doubtful.

*Henry*. There are four or five geraniums indigenous in England, that are well worth having in a garden, of which we may procure wild roots; and if you feel disposed for a ramble this evening we will go and try to get two or three, which I know we can find in the neighbourhood.

*M*. I will go gladly; and while I get ready you collect the baskets and trowels.

*H*. There is first, the Geranium lucidum, found on walls, roofs, and rocky banks, which will grow well on our rock-work, the leaves are handsome, and the flower, though small is pretty: then there is the Geranium pratense, which grows in moist meadows, the flower of which is of a bright azure blue, and large—a beautiful plant. We shall find that, I know, in the fields by the river side. Then there is the Geranium columbinum, which we can find, and which I think worthy a place when we have nothing better to fill it, though it is not usually cultivated. The Geranium phæum is a wild plant, but is rarely met with wild: that we will buy, for the sake of its dark flowers. Now let us sally forth, we have four good hours of day-light, and a moon to light us in the evening: we may, perhaps, pick up some pretty moths.

*M.* Remember to show me the water-lilies you saw the other day when you went out alone. I wish we had a pond in our garden, that we might have some of the lilies in it, they are so lovely.

*H.* Ponds are troublesome to manage, they get dirty, and cause frogs and gnats and beetles to abound in the garden; and besides, it is no easy matter to introduce the nymphæa alba into one.

*M.* How is it done, when attempted?

*H.* The plant grows with long foot-stalks to the flowers and leaves, in water at least three or four feet deep; to get up the roots from the mud at the bottom, you must wade into the pond or river, and feeling your way with your hand down the stalks to the root, you must dig at random, at the risk of cutting the root in two, and so losing your labour, and perhaps with a chance of tumbling into a deep hole in the bottom, and being soused over head and ears, if not drowned.

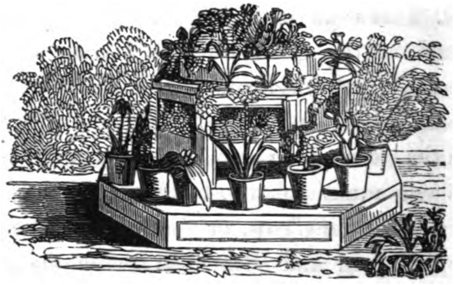
*M.* Very pleasant; but suppose you succeed, and get up a root or two uninjured?

*H.* Why, then you had better fill an old basket with mud and soil from the bottom of the same pond, and, planting your roots in it, sink it in your garden-pond: if the root grows, it will penetrate the wicker-work and enter the soil, the basket will decay in time, and the plant will be naturalized; but I tell you again the experiment does not succeed once in three times.

*M.* I saw an artificial pond in a pleasure-ground at the great nursery I went to with mamma, which was beautifully managed; it was circular, about twelve or fifteen feet in diameter, with the sides cut in steps, on which were placed tubs with aquatic plants of different kinds; there was a small *jet d'eau,* or fountain, in the middle, and gold and silver fish swimming about among the floating leaves of the lilies, and sagittaria, and other flowers. Then all round the margin there was rock-work, tastefully arranged, and covered with a variety of plants; and a quantity of large conch-shells, dispersed here and there, did not seem misplaced though really incongruous; it was altogether perfect.

*H.* I do not doubt it; where there are plenty of hands to keep such a pond in order, it is a pretty addition to a garden; but if not so kept, and we could not hope to do it, even if we had space and time for it, it is more of a nuisance than an ornament.

*M.* Then there were pretty rustic flower-stands, made in various shapes, filled with beautiful and rare plants; and such large long hot-houses, green-houses, stoves, conservatories, forcing-houses, and other houses with all kinds of names, all filled with lovely plants; I wish you had been with us to see them and tell me their names, for mamma was too much occupied with the lady who went with us to allow of my troubling her.



*H.* Well, Mary, you did not lose by your discretion it seems, for the lady gave you, in recompense and approbation of your conduct, those plants which constitute just now the pride of our garden. I wish, however, that her present had been less magnificent, for I fear much we shall not succeed in keeping the plants through the winter, for want of a proper greenhouse, or if we do preserve them by means of housing them in our drawing-room or study; they will deteriorate for want of proper air and treatment.

*M.* Yes, I longed to tell her that I should have preferred the same, or even half the same, money laid out on hardier and commoner plants, such as chrysanthemums, dahlias, china-asters, campanulas, and so on.

*H.* Let us be thankful for what we have, and make the best of it. The Agapanthus will be beautiful when it blows; and perhaps we can preserve the bulbs of it, the Tigridias, and Ferrarias, for next season.

*M.* Oh, see, there are the lilies, but they are yellow; how is that?

*H.* That is another genus and species, called

Nuphar lutea, and is but little inferior to the white Nymphæa; but there are these last beyond, at the turn of the stream, so you may compare them together. This is a beautiful spot for botanists, and, indeed, for all who admire flowers: here, within a few hundred yards, we have both genera of water lilies, the flowering rush (Butomus umbellatus,) the Sagittaria, water ranunculus, water plantain, and the Polygonum amphibium, all beautiful plants. It is a great temptation to try to obtain them in an artificial pond, but we will resist it for the reasons I have given you; I can reach some, however, for you to examine, and for papa to dry, if he likes it.

*M*. Has he not got them already? His collection is large.

*H*. I know he has them all, but the specimens of a herbarium require renewing; they become too brittle, and break, and are often attacked by moths and insects; so that collectors never neglect to dry a new specimen, if it be a fine one.

*M*. Water plants fade so soon, it is difficult to get them home alive, the leaves especially; and these hardly ever recover in water.

*H.* It is too true, but we can dissect and examine the two lilies even if they die.

*M.* What a variety of curious plants, insects, and shells are to be found in such a spot.

*H.* Yes, I think you would be much more likely to find a hundred species of either of the two former classes here, than in a wood; think of the Confervæ, and other cryptogamic plants, either floating on, or growing in, the water, or on its banks; and then, as for insects, there are not only those which live entirely in water, but those which, in their larva or pupa state, are temporary inhabitants of that element. But we must be gone, or we shall be too late home, and we shall come here again frequently: we have to get the roots of the Soap-wort and other plants, which, not flowering till August, we should not now be able to distinguish.

*M.* I suppose that was the reason you deferred coming for the geraniums till now.

*H.* Partly it was; but the geraniums are readily known by their leaves at all times.

*M.* Cultivated geraniums rank as florists' flowers, and, on that account, were excluded from your list?

*H.* They cannot live in the open ground; and, during winter, they must be put in pots, in a green-house; but we will rear some of the hardier kinds when we can get any cuttings of them: and since we have done so much with our garden, by our own labour, I think we may indulge ourselves with buying a frame, and lights to make a *cold frame*, for preserving many plants, during the winter, that require at least a glass covering in severe weather.

*M.* How do you prepare a cold frame?

*H.* Simply by beating the surface of the ground hard, and strewing ashes, two or three inches thick, for the pots to stand on, in order to keep out the worms; then, if the earth be raised round the frame, so as to exclude the cold, you may preserve cuttings of scarlet geraniums, coronillas, lobelias, flaxes, stocks, calceolarias, and many other plants, if they are potted out for the purpose.

*M.* Our frame must be tolerably large, or we shall not have room for many plants in it.

*H.* Some persons, when they have not sufficient room in their frame, take up full-grown geraniums, and, stripping off the leaves, roll the stems up in matting, and place them in a dry cellar till spring, when, if planted, and cut down to a few shoots, they will grow again. Many, if not most, shrubby plants will live, if buried entirely in the earth, for the winter; cuttings of roses, lilacs, periwinkles, and other woody shrubs, may be saved in this way.

*M.* I have often observed, in digging up a twig or branch that has been buried deep in the ground, that it was quite fresh, and even putting out shoots.

*H.* If air can but get to plants, the constant warmth and moisture at some distance below the surface of the earth is favourable to vegetation, and the privation of light only causes the shoots to be blanched and look sickly or *drawn*, but, as you know, they recover the green hue after exposure to the sun.

*M.* If exposure to light restores the green colour, or causes it in vegetation, why do not the fibrous roots of hyacinths, which are blown in white glasses, become green? and yet they never do.

*H.* It is a mystery to us at present, but from observation it has been made out, that the green colour is not the *immediate effect* of the action of light, but, that those parts of plants which have the *capacity* of becoming green, seek the light; while those parts, as the root, which have not that latent property, avoid the sun. The green colour in the herbaceous parts of plants is caused by the absence of oxygen, and the superabundance of carbon, the oxygen being abstracted by the influence of light: hence the reason why, when oxygen accumulates in consequence of privation of light, the parts become white.

*M.* But what is the cause of the endless variety of colours in flowers, for the *tissue* of the petals does not differ from that of the other herbaceous parts.

*H.* Oxygen combined in various proportions with other principles, and azote especially, is supposed to be the cause; but as yet nothing certain is known on the subject, except that the colour of flowers is weakened by absence of light and air, and that free exposure to them causes the colour to be richer, proving that these elements stand in the relation of immediate cause to the effect.

*M*. I have remarked of several blue flowers, but especially of the virginian stock, that when the buds first open, the colour of the petals is much redder than it afterwards is, or rather that the petals become more blue.

*H*. That is the effect of the abstraction of oxygen; you have seen paper stained blue with litmus, or turnsole, become red by immersion in an acid; in this case, oxygen is imparted from the acid which abounds with it. Now the reverse of this action causes the change from red to blue in the petals of the plants in question. You know that the accumulation of oxygen during the night, is the cause of the greater degree of tartness of fruit, if gathered in the morning before the sun has long shone on it.

*M*. Then, in fact, the *tartness* of fruit is absolutely derived from an acid.

*H*. Most certainly; there are many vegetable acids, and the flavour of different fruits depends probably, on this variety, and on the difference of the proper juices of the plants on which they grow; the *sweetness* of fruit, arises from sugar, and sugar is a compound of carbon, oxygen, and hydrogen, in proportions differing from those in which the same three simple elements are previously combined in the plant, the alteration taking place by the abstraction of oxygen, as I explained to you once before.

But now stop, for here are some plants of the geraniums we want. While I am getting them up, you go and gather a nosegay; by what you bring I shall be able to judge whether there are any other plants in the neighbourhood we want.

*M.* Well, I shall go down into that bog, because I see a great many flowers in it.

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*H.* So you are returned; what have you found?

*M.* Many plants new to me, but I did not dare to go far, the ground moved so, under me.

*H.* Yes, I knew it was a quaking bog, but it is of small extent and quite safe, or I would not have let you gone.

*M.* It was a singular sensation, and would be pleasant if I had not been frightened; when I first felt the earth yielding, I foolishly stood still, but finding that water was beginning to ooze through the turf, I got off on hard ground in a hurry.

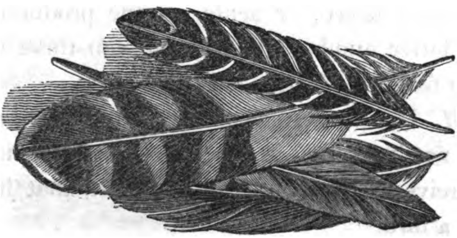
*H*. That flower is the common bog bean, *Menyanthes trifoliata*, you see it has three leaves; how pretty the fringed petals are, are they not.

*M*. But what is this singular looking plant with little round reddish leaves on long stalks, with long hairs on them.

*H*. That is the common sun-dew, the Drosera rotundifolia; it affords an example of vegetable irritability, the leaves closing on any small body, as an insect, which touches them; it does not flower till later in the summer.

*M*. Then here is some ragged robin, enchanters' nightshade, and other plants, but it is too dark to see them.

*H*. Well—then—now to return home.



*M.* Hark, what noise is that? there!—a sharp sound like a tap with a knife against glass, but very faint.

*H.* It is a bat,—see,—there he flies over your head. I heard that a celebrated philosopher* once said, the note, or voice, of a bat was the highest or sharpest sound the ear could distinguish; and he imitated it by turning a ground glass stopper suddenly in the neck of a phial.

*M.* How do you mean the ear can distinguish; cannot the ear hear any sound?

*H.* Producing a *sound* implies the hearing of it: but bodies may be set vibrating, which perform the vibrations so slowly or so quickly, that the mind is not impressed with an idea of a sound. I believe, that fewer than thirty-two or more than 8,200 vibrations in a second, are equally inaudible, and the bat's note may be nearly as sharp, or acute, as one produced by the latter number; but I give you these numbers from recollection only.

*M.* If a person had never seen a bat near, or did not know that it was a quadruped, he might perceive by the manner of its flight, that it was not a bird.

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* The late Dr. Wollaston.

*H.* Decidedly, no bird turns so sharply or makes such angles in its path as the bat does. I believe the bat can move one *wing* at a time, which birds never do. The contrast between the flight of a bat and that of an owl is striking, both animals prey at night, but the owl *sees* its prey and pounces on it, while the bat *feels* with its wings, a fine net-work of appropriate nerves being spread over their surface for this purpose. It is nearly dark now.

> The owl is abroad, the bat and the toad,
> And so is the cat-a-mountain;
> The ant and the mole, sit both in a hole,
> And the frog peeps out of the fountain.

*M.* Then it is time for us to be housed.

When the month of October returned, though the splendour of the garden had passed away, yet to the eye of a gardener it had the favourable appearance of good culture, promising well for renewed and increased beauties next year. The brother and sister had been indefatigable during the summer months in propagating by cuttings, slips, and layers, all their best perennial plants, as they went out of flower; and by repeated hoeings and diggings round them, their herbaceous perennials had thriven so well, that most of them bore taking up and dividing, so that from this source and their nursery beds, they had a stock of plants nearly sufficient to fill up their borders, if not with all the variety they wished and looked forward to, at least with sufficient to remove the reproach of having marking-sticks stand for flowers, which Mary formerly deplored.

They now planted many annuals in the warmest spots to stand the winter, if it should prove mild, which would flower the earlier in the ensuing spring: such as larkspurs, adonis, heartsease, persicaria, annual stocks, and so on.

But the business that gave them most pleasure this month, was putting in a quantity of bulbs, sent them by their aunt, as she had promised. They consisted of crocuses, snow-drops, daffodils, crown imperials, narcissuses, irises, hyacinths, lilies, and tulips of the commoner kinds, with a few of the choicer species for pots or glasses. They planted the former, and at the same time replanted their own stock, which they had taken up in summer, always taking care to put fresh sand at the bottom of the holes for the bulbs to lie on, setting them upright at regular distances, whether in clumps or in lines; they then filled up the holes or drills with rich earth, composed of light mould, sand, and rotten leaves, with a little cow-dung, the whole well mixed and made quite fine, and pressed down on the bulbs. They then put a conspicuous marking-stick to each group, to guard against their being disturbed when the borders were dug up rough for the winter.

The larger bulbs were put as much as four or five inches below the surface; the smaller, as the crocuses, at about two inches.

Narcissuses require to be planted under a south wall, and are better for being put as close as possible to the wall, so as to be protected by it from wet.

Bulbs intended to flower in pots, are best managed by being planted in the pot in the usual mixture, and at the common depth, the pots should then be buried a foot deep in the earth, either in a cold frame, or under some shelter. By thus burying the bulb, it forms healthy roots before the leaves are put forth, and in consequence becomes stronger, and blows finer. When the leaves are grown two or three inches above the mould of the pot, the pots may be dug up, and by being put into the window of a warm room, or into a green-house, the plants will flower early and vigorously. The leaves when first taken out of the ground will be of a yellow colour from want of light, but exposure to this will soon restore them to their natural colour. Little water should be given to bulbs while thus buried, but when taken up and beginning to flower, they may be watered plentifully.

It must be also mentioned, that the hard skins of tulip roots should be carefully taken off, before they are planted, for if this skin were left on, it would crack from the effect of frost and would form a loose cup in which water would lodge, and chill and rot the root.

Employment for every leisure hour was furnished for the remainder of the autumn, in removing annuals as they died, cutting off decayed branches and twigs of shrubs, and so on; in gathering, sorting, and storing seeds, taking up useless markers, and, in short, preparing every thing for winter. All dead leaves had been stored up in an obscured corner, to rot into manure for digging into the borders in particular spots, and Mary had contributed to increase the heap by throwing on it all her dead nosegays.

When every preparation had been made, when all the roots and seeds intended to stand the winter had been put in, and when every precaution had been taken for protecting tender shrubs and plants of all kinds from severe cold. Henry and his sister with their forks dug up all their borders *rough* between all the plants and markers, digging in dead leaves, and leaving the surface as broken and cracked as possible, to admit the air and frost.

One fine afternoon in the middle of the month of November, they had completed these labours, and looked round with complacency on the scene. On the spot where but thirteen months before nothing but grass had grown, a flourishing and neat garden was now to be seen, stocked with nearly a hundred different species of plants in good health and carefully cultivated. The occupation had proved the source of health to their bodies as well as to their minds, no duty had been neglected, no extravagance committed; and in recalling the events of the year, they reminded one another, that in no former equal period had they been so happy, in none had learnt so many new ideas, in none had required less amusements of other kinds. But above all in that period each had become trebly dear to the other, through community of pains, hopes, and toils,—each had learnt and taught something to the other,—and both had had their kindlier feelings to their fellow-creatures, and their gratitude and love to their Creator, strengthened by the daily intercourse with, and examination of the works of his hands.

# LIST OF SHRUBS AND PLANTS

## FOR A PLEASURE GARDEN;

WITH THE MODE OF PROPAGATING AND REARING THEM.

* Hardy. † Half-hardy. ‡ Tender. ⸸† Bulbous. A. Annual.
B. Biennial. P. Perennial. E. Evergreen.

### *Climbing Shrubs, to train against Walls, Pales, Trellis, &c.*

| | | Colour and time of blowing. |
|---|---|---|
| 1 | †Scented Allspice, *Calycanthus precox*. Requires a southern wall and peat earth. From layers or cuttings: must be covered in severe weather. Very fragrant. | Brown.<br>January. |
| 2 | †Corchorus, *Corchorus japonica*. From cuttings, requires a sheltered situation. | Yellow.<br>February. |
| 3 | *Pyrus japonica. Ditto. Ditto. | Scarlet.<br>February. |
| 4 | *Virgin's Bower, *Clemătis florida*. From cuttings, to be planted in April. | White.<br>April to Sept. |
| 5 | *Fontanesia phillyreoides. From suckers or cuttings, any soil, not too wet, will suit it. | White.<br>May. |
| 6 | †Carolina Allspice, *Calycanthus floridus*. To be raised by layers, which must not be removed till the third year; requires peat earth. Fragrant. | Brown.<br>May to August. |
| | *Honeysuckle, *Lonicera caprifolia*. From cuttings from wild plants, to be set in spring or autumn. | Pink.<br>May to August. |
| 7 | *Hungarian Climber, *Clemătis integrifolia*. From cuttings or layers. | Blue.<br>June to August. |
| 8 | *Boursault Rose. From suckers; grows fast and flowers early. Useful for hiding walls, &c. | June. |
| 9 | †Catalonian Jasmin, *Jasminum grandiflorum*. Requires a warm, sunny situation. | White and pink.<br>June to October. |
| 10 | ‡Magnolia grandiflora, E. Requires a sheltered situation and a south aspect. May be raised from layers or cuttings, but best from seed imported from America; the young plants must be carefully covered up in winter. | White.<br>July and August. |
| 11 | †Trumpet-flower, *Bignonia radicans*. From layers or suckers; the root must be covered during frost; ought to be placed against a south wall and in bog earth, but it will grow in common. | Scarlet.<br>July to August. |

| | Colour and time of blowing. |
|---|---|
| 12 †Passion-flower, *Passiflora cærulea*. Strike cuttings in autumn under a glass. It thrives best in a mixture of peat and garden earth; it must be covered over in winter or it will die down. | Green & Purple.<br>July to October. |
| 13 ‡Cobea, *Cobea scandens*. Easily raised from seeds or cuttings. It dies down in winter, if not protected from frost, Requires a south wall. | Violet.<br>August and Sept. |
| 14 *Virginian Creeper, *Vitis hederacea*, E. From cuttings. It grows very rapidly, and its leaves when dying are richly coloured. | |
| *Greater Periwinkle, *Vinca major*, P. Propagated by suckers, which form quickly. Does in any soil and situation, but prefers shade. | Blue.<br>All the year. |

### *Standard Shrubs, for small Plantations, or the backs of very wide Borders, &c.*

| | |
|---|---|
| 15 *Laurustinus, *Viburnum tinus*. | White.<br>Jan. to May. |
| 16 *Brooms, *Spartium scoparium*. Two varieties. The former white, the second yellow. | May. |
| 17 *Sweet Bay, *Laurus nobilis*. Leaves fragrant. | White.<br>May. |
| 18 *Syringa, *Philadelphus coronarius*. Flowers fragrant. From cuttings. | White.<br>June and July. |
| 19 *Magnolia glauca. Generally raised from layers, but would be much finer if raised from imported seed. Grows in any soil, ten or twelve feet high, flowers abundantly, and very fragrant. | White.<br>June to August. |
| Lilac, *Syringa vulgaris*. Propagated by shoots, suckers, or layers; requires rich earth. | White or Purple.<br>May. |
| 20 *Gum Cistus, *Cistus ladaniferus*. Propagated by cuttings of ripe young wood, put under a glass. Grows six or eight feet high. | White & Purple.<br>June and July. |
| 21 *Scorpion Senna, *Coronilla emerus*. May be raised from seed, suckers, or cuttings, planted in autumn. Papilionaceous. | Yellow.<br>April and June. |
| 22 †Alexandrian Laurel, *Ruscus racemosus*, E. May be raised from seed, but better by parting the roots of a stout plant in February or March; requires shelter and sandy earth. The fruit is a rich red berry. Grows about two feet high. | Yellow.<br>June and July. |
| 23 *Yellow-flowered Honeysuckle, *Diervilla lutea*. Propagated by suckers. It may be planted any where. Grows from two to three feet high. | Yellow.<br>June. |
| 24 †Bastard shrubby Indigo, *Amorpha fruticosa*. Propagated from seed and cuttings; better put in a light gravelly soil and warm situation, and must be sheltered in winter. Grows ten feet high. | Violet.<br>June and July. |

| | | Colour and time of blowing. |
|---|---|---|
| 25 | *Althea frutex, *Hibiscus syriacus.* Finest when raised from seed, which may be sown in the open ground, and in any tolerable soil. Grows eight to ten feet high. | Two varieties,<br>Purple or Red.<br>August and Sept. |
| 26 | *St. Peter's Wort, *Symphoria racemosa.* Best raised from seed imported from America, but may be obtained from cuttings, suckers, or by parting the roots. The fruit is a white berry. | Pink.<br>August. |
| 27 | *China Rose, *Rosa sinensis.* May be raised from cuttings. | Pink, or Red, or White.<br>June to Sept. |
| 28 | *Damask Rose, *Rosa damascena.* Raised from layers or suckers. | |
| 29 | *Provence Rose, *Rosa provincialis.* Raised from layers or suckers. | |
| 30 | *Rose de Meaux.<br>Tree Roses are obtained by *budding* (see p. 132) on a stock of the Dog Rose, two or more varieties of cultivated roses. | |
| 31 | *Golden Currant, *Ribes aureum.* By layers or cuttings. Dwarf shrub. | Rich Red.<br>April. |
| 32 | *Rhododendron, E. Propagated by layers or seed; require bog earth. There are several varieties. | Crimson.<br>June. |
| 33 | †Splendid Sage, *Salvia splendens.* This used to be considered a green-house plant, but it has become hardened to our climate if treated with care, and put in a sheltered situation. Part the roots in spring and autumn. | Scarlet.<br>July to November. |
| | Swallow Wort, *Asclepias incarnata.* Divide the roots in autumn. Grows from three to four feet. | Pink.<br>July and August. |

Peonies and Dahlias may be employed to fill up the fronts of plantations, or the backs of borders.

## *Tall Herbaceous Plants, for training up Trellis, Poles, &c.*

| | | |
|---|---|---|
| 34 | *Nasturtium, *Tropæolum majus*, A. Sow the seed from early in March to June. Thrives in any soil. Must be tied up, and will grow ten feet high. | Rich Scarlet or Orange.<br>May to Sept. |
| 35 | *Everlasting Peas, *Lathyrus latifolius*, P. and *Lathyrus grandiflorus*, A. Sow in pots early, to transplant, or may be sown where they are to remain. The seed of the last is not common. | Pink.<br>July and August. |
| 36 | Dolichos, *D. purpureus.* From cuttings placed under a hand-glass, or from seed. | Lilac.<br>June and July. |
| 37 | *Convolvulus major, *Convol. purpureus*, A. Sow at any time in the spring months. Twines round its support like the wild bind-weed. | Purple.<br>July and August. |
| 37 | †Maurandia barclaiana, P. From shoots; requires shelter and good soil. | Purple.<br>June and July. |

| | Colour and time of blowing. |
|---|---|
| †Ipomœa coccinea, P. From seed, sown in pots and planted out. | Scarlet.<br>July and August. |
| 38 †Periploca græca, P. Shrubby. From slips or cuttings. Grows in any soil. | Green.<br>July and August. |

*Tall Standard Herbaceous Plants, for the back Rows of Borders, &c.*

| | |
|---|---|
| 39 †Superb Martagon Lily, *Lilium superbum*, P. ⸸†. Requires bog earth. It must be taken up every three or four years in September, and the offsets taken off and re-set in October, by which means it is propagated. Grows eight to ten feet high. | Bright Orange.<br>July and August. |
| 40 *Gaura, *Gaura biennis*, B. Sow the seed as soon as it is ripe, it will come up in the following spring, and blow the next year. Five or six feet high. | Pale Red.<br>August to Sept. |
| 41 *Hollyhock, *Althæa rosea*, B. Sow seed in open ground, and transplant the young plants when a month old. Requires good earth and sheltered situation. Though a biennial, it will last several years, but deteriorates. It will grow to ten or twelve feet, but must be tied to a stake to prevent its being blown down. | Several colours.<br>June to Sept. |
| 42 †Yellow Asphodel, *Asphodelus luteus*, P. ⸸†. Seed must be sown on a hot-bed. Propagate by separating the offsets. It requires a moist soil. | Brilliant Yellow.<br>May. |
| 43 *Verbascum, *Verb. lychnitis*. P. Sow the seed as soon as ripe in a light, sandy soil. Grows naturally on chalky soils. A native plant. | Yellow or White.<br>June, July, & Aug. |
| 44 *Tall Vernonia, *Vern. præalta*, P. Propagated by parting the roots, or by seed sown in the open earth in a rich loamy soil. | Purple.<br>Sept. to Nov. |
| 45 *Pyramidal Aconite, *Aconitum pyramidale*. Raise from seeds, and part the roots. Grows five or six feet high. | Blue.<br>July and August. |
| 46 *Viper's Bugloss, *Echium violaceum*, P. Sow seed early in spring. Requires light soil. A beautiful species. *E. vulgare* is a native plant. | Brilliant Blue and Red mixed.<br>June to August. |

*Plants, from Two to Three Feet high, for the Third Rows of Borders.*

| | |
|---|---|
| 47 *Scarlet Martagon Lily, *Lilium chalcedonicum*, P.†⸸. Propagate from offsets taken soon after flowering, and re-planted directly. Good soil and situation. Must be taken up every three or four years, and re-planted in October. | Scarlet.<br>June and July. |

| | | Colour and time of blowing. |
|---|---|---|
| 48 | *Fox-glove, *Digitalis purpurea*, B. Sow the seed in spring, on a hot-bed if possible, prick out the plants when they come into rough leaf; in autumn transplant it into the borders where it is to remain. | Purplish Red.<br>June to Sept. |
| 49 | *Monarda, *M. didyma*, P. Propagated from suckers, or by sowing the seed in a hot-bed in spring, and planting out when five or six inches high. | Crimson.<br>June to August. |
| 50 | †Chelone, *C. barbata*, P. Raised from seed, and propagated by parting the roots in the autumn. Require moist earth and shade. | Fine Red.<br>July and August. |
| 51 | *Scarlet Lychnis, *Lych. chalcedonica*, P. Sow seed, and plant out the young plants in spring, may be propagated afterwards by parting the roots. Require a good light soil, rather moist. | Scarlet.<br>July and August. |
| | *Poppy, *Papaver rhœas*, A. Sow the seed obtained from the wild plants in a light soil. | Crimson.<br>June to Sept. |
| 52 | *Lavatera, *L. trimestris*, A. Sow the seed early in spring. The richer the soil the better. | Pink.<br>July to Sept. |
| 53 | *Leopard's Bane, *Doronicum plantagineum*, P. Raised from cuttings and suckers, planted in autumn. | Yellow.<br>April. |
| 54 | *Œnothera grandiflora, B. Seed to be sown in a bed. Plant in a moist soil and sunny situation. | Rich Yellow.<br>July to Sept. |
| 55 | *Coreopsis, *C. auriculata*, P. Propagated by dividing roots. Plant in an open spot. | Yellow.<br>August and Sept. |
| 56 | †Marvel of Peru, *Mirabilis jalapa*, A. Sow the seed in April in the open ground, and leave plenty of room. Dig and manure the earth well during its growth; and if the root be taken up in autumn and kept in sand during winter, it may be made perennial. It will grow four foot high. | Yellow.<br>July to October. |
| 57 | *Yellow Michælmas Daisy, *Aster grandiflorus*, P. Sow seed, or more easily, part the roots in spring. | Yellow.<br>October and Nov. |
| 58 | *Monk's Hood, *Aconitum napellus*. Sow the seed in spring to transplant, or part the roots in autumn. Requires good soil of any kind. A native plant. | Blue.<br>May and June. |
| 59 | *Columbine, *Aquilegia vulgaris*, P. Propagated by dividing the roots in autumn. Prefers a clayey soil and shade. A native plant. | Blue.<br>May to July. |
| 60 | *Fleur-de-lis, *Iris susiana*, P. Should be planted in good soil, and should be removed every three years. | Blue.<br>June. |
| 61 | Larkspur, *Delphinium elatum*, P. Sow the seeds in spring or autumn. | Blue.<br>August. |
| 62 | Purple Candy-tuft, *Iberis umbellata*. Sow the seed in the beds in clumps. It will succeed in any soil. | Purple.<br>June and July. |
| 63 | Centaury, *Centaurea moschata*. Sow the seed in pots, and plant out when large enough. | Purple.<br>July and August. |

| | | Colour and time of blowing. |
|---|---|---|
| 64 | *Astrantia major, P. Any soil and situation not shady. Raised from seed, or by dividing roots. | White and Red.<br>June to Sept. |
| 65 | *White Lily, *Lilium candidum*. P. ⸸†. Part the roots in October every two or three years, and plant again directly. Grows in any soil and situation. | White.<br>July. |
| 66 | *Chrysanthemum, *C. indicum*, P. Propagated by cuttings in summer, or by dividing the roots in spring. Requires good soil, and moving every two years. | White or variegated.<br>October to Dec. |
| 67 | *Argemone grandiflora, A. Sow the seed in spring. | White.<br>July and August. |

## *Plants, from One to Two Feet high, for the Second Rows of Borders.*

| | | |
|---|---|---|
| 68 | *Double Wall-flower, *Cheiranthus cheiri*, B. Propagated by cuttings. Planted in good soil, and sheltered. Severe frosts injure it, it should therefore be covered up during such. Fragrant. | Rich striped Crimson.<br>April to June. |
| 69 | *Brompton Stock, *Cheiranthus coccineus*, B. Sow in June, and plant out the young plants in autumn; they must be covered in severe frosts. | Scarlet.<br>May and June. |
| 70 | †Lychnis coronaria. Strike cuttings in spring. The roots should be taken up in autumn and potted, to preserve them during winter. | Scarlet.<br>June and July. |
| 71 | *Soap-wort, *Saponaria officinalis*, P. Propagated by runners. Will do in any soil or situation. | Red or White.<br>July to Sept. |
| 72 | *Flos Adonis, *A. annua*, A. Sow the seed in April. Requires great care in transplanting, to preserve the roots uninjured. | Crimson.<br>July to Nov. |
| 73 | *Penstemon, *P. angustifolia*. Divide the roots in autumn. | Pink.<br>Sept. and Oct. |
| 74 | *Bitter Spring Vetch, *Orobus vernus*, P. The seeds must be sown in the open ground as soon as they are ripe. Plant out the young plants in the following spring. Any soil suits it. | Pink.<br>March and April. |
| 75 | *Barren Wort, *Epimedium alpinum*, P. Propagated by parting the roots. Requires rich earth and shady situation. A rare native plant. | Red and Yellow.<br>April and May. |
| 76 | *Lobel's Catch-fly, *Silene armeria*, P. Easily propagated, by parting the roots in spring or autumn. Should have good soil. | Pink.<br>May and June. |
| 77 | *Clarkea, *C. pulchella*, A. The seed should be sown in patches in April. | Pink.<br>June and July. |
| | *Red Dead Nettle, *Galeopsis ladanum*, A. Seed may be sown in any soil. | Pink.<br>July to October. |
| 78 | *Lupine, *Lupinus varius*, A. Sow the seed in spring. | Red or Blue.<br>July and August. |

| | Colour and time of blowing. |
|---|---|
| 79 *Great Daffodil, *Narcissus major*, P. ⸸†. Propagated by offsets. | Yellow.<br>April. |
| 80 *Globe-flower, *Trollius europæus*, P. Divide the roots in autumn. Requires moist earth, and rather shady place. A native plant. | Yellow.<br>May. |
| 81 *Tulip, *Tulipa sylvestris*, P. ⸸†. Part the offsets, and plant in a light soil. A native plant. | Yellow.<br>May. |
| 82 *Onosma, *O. echioides*, P. Seed to be sown in dry soil. Should be covered in severe weather. | Yellow.<br>May. |
| 83 *Star of Bethlehem, *Ornithogalum pyrenaicum*, P. Separate the offsets in autumn, and plant them again directly. | Yellow.<br>May and June. |
| 84 *Ring-flower, *Anacyclus valentinus*, A. Sow the seed in good light soil. | Yellow.<br>June and July. |
| 85 *Lupine, *Lupinus luteus*, A. (See the other species.) | Yellow.<br>June to August. |
| 86 *Oenothera, *O. biennis*, B. Sow the seed in the spring, in the spot where it is to blow. Requires good earth. Protect during the winter. | Yellow.<br>July to Sept. |
| 87 *Oenothera odorata, P. Fragrant. | Yellow.<br>July and August. |
| 88 *Yellow Sweet Sultan, *Centaurea suaveolens*, A. Seed must be sown in a bed, and the young plants transplanted when old enough. | Yellow.<br>July and August. |
| 89 *Coreopsis, *C. delphinifolia*, P. Propagated by dividing the roots. Any soil will do, but not too much shaded. | Yellow.<br>July to October. |
| 90 *Henbane, *Hyoscyamus aureus*. Plant cuttings in pots, which must be put in the ground in summer, and must be sheltered in winter. | Yellow.<br>July to Sept. |
| 91 *Italian Squill, *Scilla italica*, P. ⸸†. Propagated from offsets. Likes sandy earth; better if sea-sand be mixed with the soil. | Blue.<br>March and April. |
| Campanula azurea, P. From seeds, or by dividing the roots. | Blue.<br>June. |
| 92 *Dame's Violet, *Hesperis matronalis*, B. Propagated by cuttings, set under a hand-glass, and exposed to a morning sun. | Purple.<br>May to August. |
| 93 *Siberian Iris, *I. sibirica*. Thrives best in moist soil. | Purple.<br>June. |
| 94 *Devil-in-a-bush, *Nigella damascena*, A. Seed to be sown in patches, in a warm situation. | Blue.<br>June to Sept. |
| 95 *Spider-wort, *Tradescantia virginiana*, P. Part the roots in March and October; leave room enough. | Blue.<br>June to October. |
| 96 *Lobelia, *L. urens*. Sow seed in a good soil, not too light, and water often. A rare native plant. | Blue.<br>July and August. |
| 97 *Immortal Flower, *Xeranthemum annuum*, A. Seed to be sown in spring. | Purple.<br>July and August. |

| | | Colour and time of blowing. |
|---|---|---|
| 98 | *Lindley's Oenothera, *O. lindleyana*, A. Seed to be sown in spring. | Striped Purple.<br>July and August. |
| 99 | *Gillia capitata, A. | Blue.<br>July and August. |
| 100 | *Zinnia, *Z. multiflora*, A. Sow the seed in April; or in February in a hot-bed, to plant out in April. Does well in moist soils. | Brown.<br>July to Sept. |
| | *Scabiosa atropurpurea, A. Sow the seed in spring in light soil. | Brown Purple.<br>July. |
| 101 | Saxifrage, *Saxifraga palmata*. Part roots, &c. | White.<br>March and April. |
| 102 | †Petunia, *P. nyctaginiflora*. Propagate by cuttings under a hand-glass, or sow the seeds, as for an annual, in the spring. | White.<br>May to October. |
| 103 | *Solomon's Seal, *Convallaria polygonatum*. Divide the roots in autumn. Prefers shade. | White.<br>May and June. |
| 104 | *Egg-plant, *Solanum melongena*. A. Sow the seed in a light rich soil. Fruit white and singular. | White or Violet.<br>June and July. |
| 105 | *Soap-wort, *Saponaria officinalis*, P. Propagated by runners. A native plant. | White species.<br>July. |
| 106 | *Dwarf Larkspur, *Delphinium*, A. To be sown, from March to June, every fortnight, where it is to blow in rows, or in clumps. | White, Pink, or Blue.<br>June to Sept. |
| 107 | *Sweet William, *Dianthus barbatus*, B. Sow the seed in a bed. Hoe and weed well during the summer. Plant out in clumps in autumn; the plants to be put about six inches apart. | Various colours.<br>June to August. |
| 108 | *Common Pink, *Dianthus hortensis*. Propagated by layers, pipings, or seed. It will succeed in any soil with a little care. The roots should be parted every year. | Various.<br>June to August. |
| 109 | Sweet Pea, *Lathyrus odoratus*. Sow the seed in patches, any time from beginning of March to July. Care must be taken to put sticks in time for the plants to climb up. | Various.<br>All the summer. |

### *Plants, from Two to Twelve Inches high, for the front Rows of Borders.*

| | | |
|---|---|---|
| 110 | *Anemone, *A. coronaria*, P. Sow the seed in fine earth, and lightly covered, under a glass in January. Water them frequently, and guard from frost and sun. When the young plants die down, in March or April, take up the tubers, and put them by till October or November, when they must be set in the borders in rows, to blow the following spring. After the second year, the roots may be divided when they have done blowing, in order to increase the stock. They require rich earth and manure to become fine. | Scarlet, and all colours.<br>February to May. |

| | | Colour and time of blowing. |
|---|---|---|
| | *Corydalis bulbosa, P. Requires light and rich soil. Raised from seed, or by dividing roots. | Red.<br>Feb. and March. |
| | *Auricula, *Primula auricula*, P. Sow the seed in December under glass, or in March in fine earth, in boxes or pans, lightly covered; when the young plants have five or six leaves, transplant them into other pans, watering them gently now and then. Plant out when they are strong enough. Cut off offsets, or pull off slips for multiplying in July or August. The soil required is a compost of half garden-mould and half well-rotted cow-dung. Part the roots of the border plants every three years. | Various hues.<br>April and May. |
| 111 | *Double Daisy, *Bellis perennis*, P. Divide the roots in February and March. | Red and White.<br>April to July. |
| | *Phlox subulata and setacea, P. P. Propagate by cuttings or dividing roots. Require rich loam. | Red.<br>April. |
| 112 | *Virginian Stock, *Cheiranthus maritimus*, A. Sow the seed at any time in spring. | Pink.<br>May to July. |
| 113 | *Thrift, *Statice armeria*, P. Propagated by parting the roots every year. A native plant. | Pink.<br>May and June. |
| | *Palmonaria officinalis, P. Propagated by parting the roots. A native plant. | Pink.<br>May. |
| 114 | *Potentilla, *P. napalensis*, P. A trailing plant. Part the roots in spring and autumn. | Pink.<br>June to August. |
| | *Œnothera rosea-alba, A. Seed to be sown in spring, in the open border. | Pink.<br>June and August. |
| 115 | †Scarlet Verbena, *V. chamædrifolia*, P. Easily propagated by cuttings or layers. The roots should be covered over in winter when it dies down, and then it will spring up again. | Brilliant Scarlet.<br>June to October. |
| 116 | *Rose Campion, *Agrostemma cœlirosa*, A. | Pink.<br>July and August. |
| | *Antirrhinum orontium, A. Seed to be sown in spring. | Red.<br>July and August. |
| | *Erythræa Centauria, P. Wild roots to be transplanted. Requires a chalky soil. | Pink.<br>July to Sept. |
| | *Indian Pink, *Dianthus chinensis*, B. This, as it blows the first year, is usually cultivated as an annual, by sowing the seed in spring. It may be propagated as other pinks, by dividing the roots, and by cuttings. pipings, &c. | Red.<br>July. |
| 117 | *Crocus, *C. vernus*, P. ⸸†. Plant the bulbs in small clumps of eight to twelve bulbs, at three inches apart. Every three years take up them up, separate the offsets, and re-plant in new spots. The soil should be light, and not wet. A native. | Yellow, Blue, or Striped.<br>Feb. and March. |

| | Colour and time of blowing. |
|---|---|
| 118 *Winter Aconite, *Eranthis hyemalis*. Best propagated by parting the roots in summer, from June to October. Should be planted in clumps or rows. | Yellow.<br>Feb. to April. |
| 119 *Star of Bethlehem, *Ornithogalum luteum*, P. ‡†. Separate the offsets in autumn. Requires moist soil and shade. A native plant. | Yellow.<br>March. |
| 120 *Least Daffodil, *Narcissus minor*, P. ‡†. Separate the offsets, and plant them in clumps. | Yellow.<br>March and April. |
| 121 *Great Ox-eye, *Adonis vernalis*, P. Sow the seed, or part roots. | Yellow.<br>April and May. |
| 122 *Alyssum, *A. saxatile*, P. Set slips or cuttings in autumn and winter. | Yellow.<br>April and May. |
| 123 *Cowslip, *Primula veris*, P. May be raised from seed, sown in light earth in shallow pots, and covered with sandy mould. The plants should remain a year in the pots before they are planted out. The wild roots taken up and set in the borders is however a shorter way, though the flowers are not so large as the cultivated ones. | Yellow.<br>April and May. |
| 124 †Mimulus Luteus. Cuttings must be put under a hand-glass, and planted out in moist situations. The Musk Mimulus is a variety, and may be Propagated in the same manner, but requires more shelter and care, being tenderer. | Yellow.<br>June to October. |
| 125 †Escholtzia, *E. californica*, P. Sow the seed in spring. The root should be taken up in the autumn, and kept during the winter in sand, and put out again in spring. It sows itself when the seed is ripe. | Splendid Yellow.<br>June to August. |
| 126 *Oenothera, *O. macrocarpa*, P. A trailing plant. Propagated by parting the roots. Flower large. | Yellow.<br>July and August. |
| *Diotis Candidissima, P. A dwarf shrub. Propagated by layers and cuttings. Does best on a stony soil. | Yellow.<br>August. |
| 126 *Hounds' Tongue, *Cynoglossom omphaloides*, P. Propagated by parting the roots after flowering. Requires moving every two years, and wants watering in dry weather. | Blue.<br>March. |
| *Pulmonaria virginica, P. Propagated by parting the roots in autumn. | Blue.<br>April. |
| 127 *Violet, *Viola odorata*, P. Sow the seed in a shady spot as soon as it is ripe, in August; the plants will come up in spring, and must be transplanted into a shady bed, to remain till autumn, when they may be again moved to where they are to remain. The roots may be parted every three years. | Purple.<br>February to May. |

| | Colour and time of blowing. |
|---|---|
| 128 *Dog's-tooth Violet, *Erythronium dens-canis*, P. Transplant the parted roots in summer, and plant in patches. The leaves are spotted. | Purple.<br>April. |
| 129 *Hearts'-ease, *Viola tricolor*. The numerous varieties are obtained by cultivation in different soils, propagated by parting the roots, and new species obtained from the seed. Planted in good soil, and in shade. | Blue and Yellow.<br>May to Sept. |
| 129 †Soldanella, S. *Alpina*, P. Separate the roots. Requires heath mould, and must be sheltered from hard frosts. | Purple.<br>March and April. |
| 130 *Virginian Cowslip, *Dodecatheon media*, P. Propagated by separating the roots every three or four years. Requires good earth, mixed with cow-dung. | Purple.<br>April and May. |
| 131 †Gentianella, *Gentiana acaulis*, P. Best raised from seed. It requires a loamy soil, and open, exposed place. The roots may be parted in autumn. | Blue.<br>May. |
| 132 *Venus' Looking-glass, *Campanula speculum*, A. Seed to be sown early in spring. | Purple & White.<br>May to July. |
| 133 *Ziziphora, *Z. capitata*. Sow the seed in spring or autumn. | Purple.<br>June and July. |
| 134 †Dragon's Head, *Dracocephalum austriacum*, P. Increased by parting the roots every three years. Requires a rich earth. | Blue or Red.<br>July and August. |
| 135 *Meadow Saffron, *Colchicum autumnale*, P.⸸†. Separate the offsets when the leaves die down, and plant them in July. A native plant. | Purple.<br>Sept. and Oct. |
| 136 *Christmas Rose, *Helleborus niger*. Part the roots in autumn. Requires open situation; moist, and not rich soil. | White and Green.<br>Jan. to March. |
| 137 *Snow-drop, *Galanthus nivalis*, P. ⸸†. Set the bulbs in autumn or winter, in small clusters; as they are small, the spot should be marked with a stick all the year, to prevent their being disturbed. A native plant, but rare. | White.<br>Feb. and March. |
| Adoxa -Moschatellina, P. Transplant the wild roots. A native plant. | Green.<br>Feb. to April. |
| Asperula odorata, P. Requires shade and loamy soil. Very fragrant. Transplant wild plants. | White.<br>May and June. |
| 138 †Sand-wort, *Arenaria balearica*. Sow the seed, afterwards part the roots. It requires a warm soil and southern aspect. | White.<br>May and June. |
| *Leiogyne granulata, P. Wild roots to be carefully taken up. It is found on the banks of rivers. | White.<br>May and June. |
| 139 *Star of Bethlehem, *Ornithogalum umbellatum*, P. ⸸†. Separate the offsets in autumn, and plant them directly. A native plant. | White.<br>May and June. |

| | | Colour and time of blowing. |
|---|---|---|
| | Convolvulus Minor, A. Sow the seed in spring. | Blue and White.<br>June to Sept. |
| | *Hepatica, *Anemone hepatica*. Sow seed, or divide the roots. Requires rich dry earth. | Various colours.<br>Feb. and March. |
| 140 | *Venus' Navel-wort, *Omphaloides linifolia*, A Sow seed in March. | White.<br>July to Sept. |
| 141 | *Mignonette, *Reseda odorata*, A. Sow the seed in clumps, but not too thickly, and in dry sandy earth. In favourable situations it will sow itself. | Green.<br>All the summer, till December. |

## *Plants, for Rock Work.*

Yellow Alyssum,—Cistus,—Houseleek (*Sempervivum tectorum*); propagated by suckers.—Lichnidea (*Phlox divaricata*); propagated by cuttings or layers.—London-pride (*Saxifraga umbrosa*); part the roots in spring or autumn.—Snap-dragon (*Antirrhinum majus*); propagated by seed.—Soap-wort (*Saponaria ochymoides*); propagated by slips or cuttings.—Toad-flax (*Linaria cymbalaria*); creeping plant; propagated by parting the roots; it spreads fast.—*Zinnia multiflora*, A.; sow the seeds in April.—Periwinkle (*Vinca minor*),—Stone-crop (*Sedum acre*); from cottage roofs and walls.—Saxifrages.—(*Nolana prostrata*).—Money-wort (*Lysimachia nummularia*). A native plant found in moist meadows.

All these plants are best planted among the stones, by slips, or cuttings, or roots; care must be taken that there is plenty of earth filled into the crevices, and that this is not washed away from the roots by watering or rain before the plants have struck.

THE END.

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